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The International Journal of Orthodontia

Editor: Martin Dewey, D.D.S., M.D.

VOL. II

ST. LOUIS, FEBRUARY, 1916

NO. 2

ORIGINAL ARTICLES

STUDENTS AS ORTHODONTISTS.

BY ADELBERT FERNALD, D.M.D.

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THE question is often asked, "Is it practical for dental students to do orthodontia?" In answering this question there are several sides to be considered. First, the ability of the student, and second, the student's education and practical training along those lines related to orthodontia. To give a student a case of malocclusion to treat without first having that student thoroughly trained along orthodontic lines is malpractice, but to give him a training in an efficient course of lectures and practical work, covering a period of not less than two years of nine months each, along with the outside reading of text books, I think it is then perfectly safe in allowing him to take charge of two cases of malocclusion, the student doing all the work, making all the necessary appliances, but being directed by an instructor in charge. During the session of 1914 the students at the Harvard Dental School successfully treated 109 cases of malocclusion, made 228 appliances, occluded 308 models of the regularity, and for practice work, made 64 models and 108 regulating appliances.

I will not take time to show the many common cases which were successfully treated by the students, but will give the history of a few special cases, which I think will be of interest. The cases illustrated in this article do not represent our whole clinic, as they have been selected only from one-fourth of the clinic of which I have charge.

Case I.—The first case (Fig. 1) is a Class II, Division 2 case of a little girl 11 years of age. The case was treated in 1913. Clamp bands were placed on the first permanent molars, the expansion arch was adjusted with the intermaxillary hooks. The superior arch was expanded. Plain bands were placed on the centrals, a spur at the mesio-linguo-gingival angle for the rotation of the centrals. Clamp bands were placed on the first permanent molars below, and the expansion arch adjusted. The lower incisors overlap each other, which does not show in the photograph, and they were also expanded and carried forward to make them occupy their

proper position in the line of occlusion. After the upper arch was expanded, the intermaxillary anchorage was adjusted to bring the lower arch forward and establish a normal mesio-distal relation of the arches. In treating Class II, Div. 2 cases, a better result is obtained by first expanding the arches to their proper size, and then employing intermaxillary rubbers to bring the lower arch forward, thereby avoiding an unnecessary strain upon the upper molars, which would result if they were used as anchor teeth, both in expanding the upper arch in the incisor region and as an intermaxil-

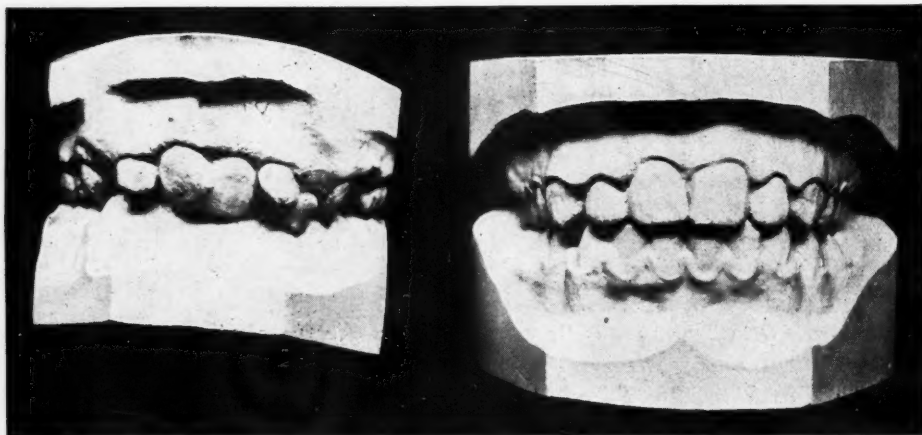


Fig. 1.

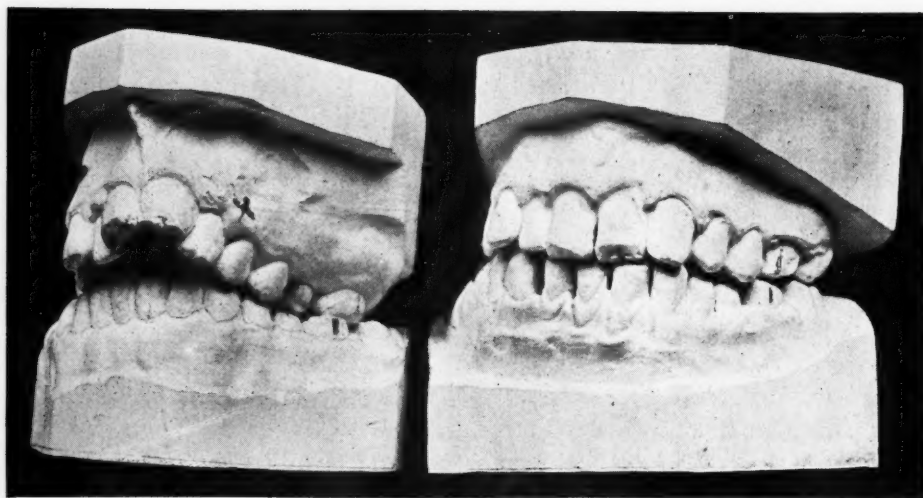


Fig. 2.

lary anchorage to bring the lower arch forward. By first expanding the upper arch, before putting on the intermaxillary rubbers, we have an opportunity of conserving our molar anchorage, and by having all the upper teeth ligated to the upper alignment wire after they have been expanded, we greatly increase our anchorage and are thereby able to bring the lower teeth forward to their proper position. The upper teeth were retained by placing plain bands upon the superior molars and cuspids, and an 18-gauge wire was soldered to the lingual side of all four bands. An 18-gauge wire was soldered

to the labial surface of the cuspid bands, running across the labial surface of the centrals, terminating in a hook at each end for an intermaxillary elastic. The use of a wire labial and lingual to the central incisors prevented them from rotating, eliminating the use of bands upon those teeth during the process of retention. The inferior first molars and canines were also banded and an 18-gauge wire soldered to the lingual surface of the bands. A hook was soldered to the mesio-buccal angle of the lower first molar band, and intermaxillary rubbers were adjusted to the hook on the lower molar band and the hook on the upper canine band, and worn for some time. The patient was eleven years old, and today the occlusion and the facial lines are normal. The parents and the little patient are very grateful for the improvement which the student made. The finished result is shown on the right-hand side of Fig. 2.

Case 2.—The second case is a Class II, mutilated condition. The girl is twenty-four years of age, and the superior left lateral has been extracted. All four of the first permanent molars were badly broken down and improv-



Fig. 3.

erly filled. The cutting edges of the upper and lower incisors were full of pits and grooves, due to the imperfect health of the patient. The models of the case before treatment are shown in the left view of Fig. 2, and the cross mark on the upper model should be in the region of the lateral incisors, as that tooth is missing, instead of in the canine region. The occlusal view of the case, before treatment, is shown on the left of Fig. 3, and it will be seen that the arch is very much contracted, which resulted in an underdevelopment of the nasal cavity, interfering with the patient's breathing and general health. The patient, at the time treatment was begun, was not in the best of health, the mastication of her food was imperfect, and she probably would have suffered more or less during her entire life because of her inability to masticate properly and her inability to breathe through her nose, owing to the contraction of the upper arch and the hard palate, and the underdeveloped nasal cavity. This type of patient is always subject more or less to chronic colds, since any congestion of the mucous membrane in the nasal tract interferes with breathing a great deal more than it does in an individual who has a normal occlusion and a normal nasal passage. Clamp bands and expansion

arches were placed on the upper and lower first molars with intermaxillary hooks in the region between the canine and lateral. The upper arch was so adjusted that there was expansion in the canine region, and the arch rested

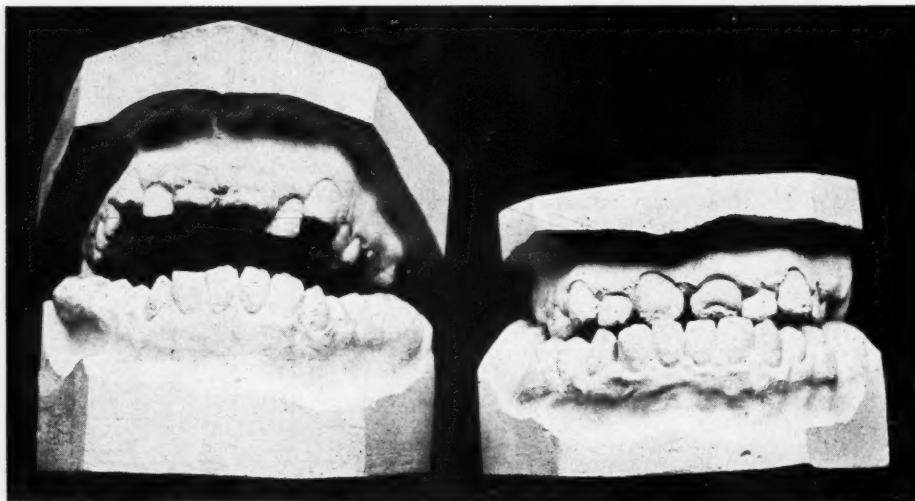


Fig. 4.



Fig. 5.



Fig. 6.

against the central incisors. By expanding the canines, laterals, and premolars, the dental arch was widened, and the nasal space was increased. The right-hand model in Fig. 3 shows very nicely the change that was brought about. The upper arch in the premolar region was expanded

nearly three-quarters of an inch. The retention of the case was accomplished by making bands for the canines and molars of the upper arch. A wire was soldered on the labial surface of the canine band, extending from one band to the other, the distal end of which was bent into a hook to receive the intermaxillary rubber. Bands were made on the lower molars and canines and a lingual wire was soldered to all four bands. A hook was attached to the mesio-buccal corner of the lower first molars to engage the intermaxillary rubber which extended to the hook on the upper canine, which was used as intermaxillary retention for a short time, and then discontinued. As a result of the treatment of malocclusion, the patient's health was very much improved, and she can now breathe through her nose and masticate her food much better. The case was finished in 1914.

Case 3.—The third case is a mutilated case of Class III, in a girl 14 years of age. The first permanent molars were badly decayed, and the cutting edges of the central incisors were missing, owing to the atrophy of the enamel organs. The left-hand model in Fig. 4 shows the front view of the

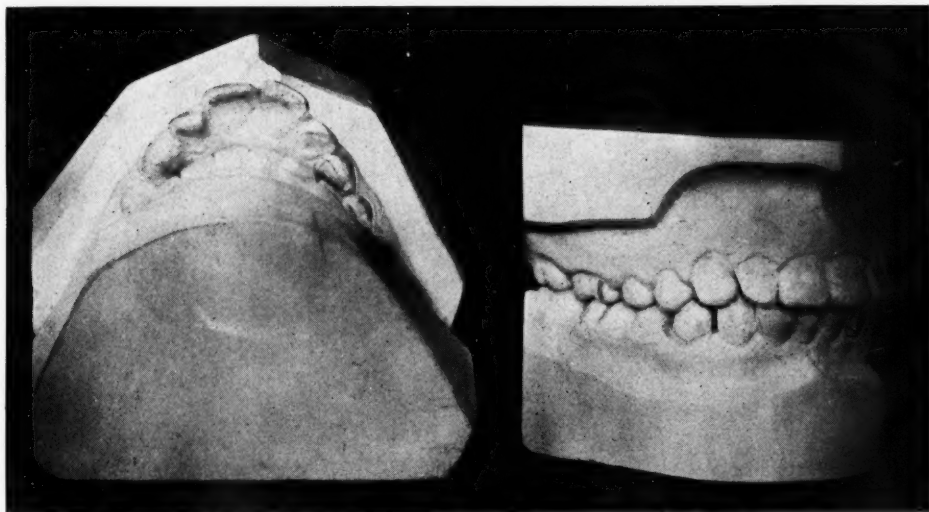


Fig. 7.

models before treatment, and it will be seen that the only teeth in occlusion are the second permanent molars. Fig. 5 shows a photograph of the patient's face, and the position of the anterior teeth can be seen; the patient was unable to close the anterior teeth, the second molars being the only teeth in occlusion. Owing to the fact that the patient could not close the teeth, the speech was very much interfered with, and proper mastication was impossible. The infraocclusion in the region of the central incisors was little more than half an inch. The treatment of the case was begun in 1913, and at the present writing is not quite completed. The superior first molars were banded with clamp bands; plain bands were placed on the six anterior teeth, with hooks on the labial surface for the alignment wire to rest in. The lower first molars and six anterior teeth were also banded, hooks were placed on the labial surface of the lower incisors for the lower alignment wire. Intermaxillary hooks were placed on the lower alignment wire in the cuspid region. Intermaxillary rubbers were adjusted and worn until the molars and bicuspid

were nearly in normal occlusion before intermaxillary anchorage was applied up and down to close the infraocclusion in the region of the canines. These intermaxillary anchorages, or rubbers, in the region of the canine to reduce the infraocclusion, were attached from the intermaxillary hook on the lower arch to a hook placed on the upper arch. All the anterior teeth being banded above and below, the teeth were ligated to the arch, so there could be no slipping, and thus the infraocclusion was reduced gradually without producing any harm to the pulps of the teeth. Fig. 6 shows the great improvement accomplished in the facial outline, while the model on the right in Fig. 4 shows the improved condition of the teeth and the amount of lengthening brought about in the region of the incisors. It will be observed that the length-



Fig. 8.

ening, or the occlusion of the incisors, has been accomplished without increasing the length of the crown; in other words, the gum and the alveolar process have moved with the teeth. Just exactly where the greatest amount of movement has occurred I am not prepared to state. The case is still under treatment. The patient attended school while the treatment was in progress, and the general health has been good. The photograph from which Fig. 6 was made was taken October 20, 1915. It is our intention to crown the upper central incisors later.

Case 4.—This patient was a girl 16 years of age with a Class II case of malocclusion, with protruding upper incisors, excessive overbite, narrow upper arch, underdeveloped mandible, which can be seen on the left of Fig.

7. The occlusion of the lower incisors against the upper gum can also be seen. In this class of cases, it is not only necessary to move the lower arch forward, but it is also necessary to elongate the molars so as to overcome the supraocclusion or excessive overbite in the region of the incisors. This excessive overbite is probably the result of an infraocclusion of the lower molars, rather than supraocclusion of the lower incisors. Bands were placed on the upper first molars, and the alignment arch was adjusted so that it rested against the labial surface of the central incisors and stood buccally to the canines. Intermaxillary hooks were placed on the upper alignment wire in the region between the canine and lateral incisors, and the incisors and premolars were expanded by being ligated to the alignment wire. Bands were placed on the lower molars and premolars, and the alignment wire ligated to the lower teeth. By the use of the intermaxillary rubbers the upper incisors were retruded, and the forward pull of the lower molars moved the lower teeth forward, and when the lower incisors came in contact with the upper teeth the continued pull of the intermaxillary rubbers elongated the

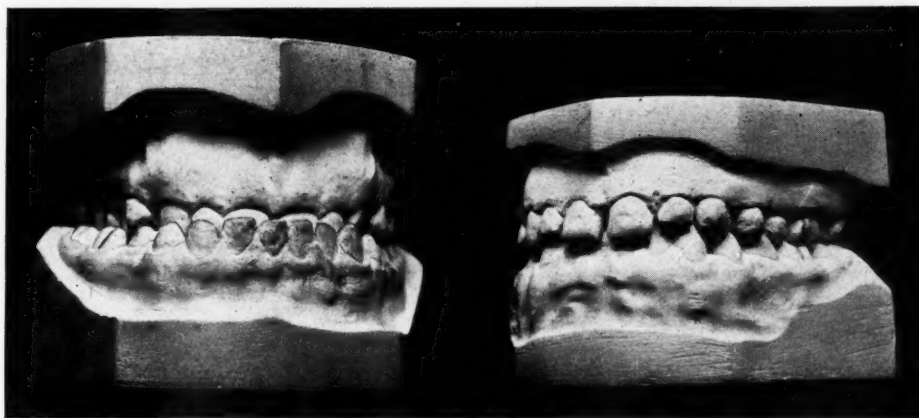


Fig. 9.

lower molars as is shown by the model on the right-hand side of Fig. 7. Retention was accomplished by using the same sort of appliance as described in the first case. The facial lines of the patient were very much improved and the patient was very grateful.

Case 5.—This patient (Class III), a boy 14 years of age, had all the teeth present and in good condition. Fig. 8 shows the facial profile of the patient, and the case is very interesting and remarkable because of the rapidity with which it was corrected. The first permanent molars were banded and the alignment wire adjusted, intermaxillary anchorage being used. The models on the left in Fig. 9 show the case before treatment, with all the upper incisors in lingual occlusion to the lowers. In five months all of the appliances were removed, as normal occlusion had been established. The patient was kept under observation for four months, with appointments every few days, and as the occlusion remained normal, no retaining appliances were applied. The boy attended high school while his teeth were being treated, and although results were obtained so quickly, no harm was done. He complained of his teeth being sore only during the time the

superior incisors occluded on the cutting edge of the inferior incisors. Although his teeth were moved more rapidly than would be advisable for the majority of cases, none of the pulps were destroyed as the result of



Fig. 10.



Fig. 11.

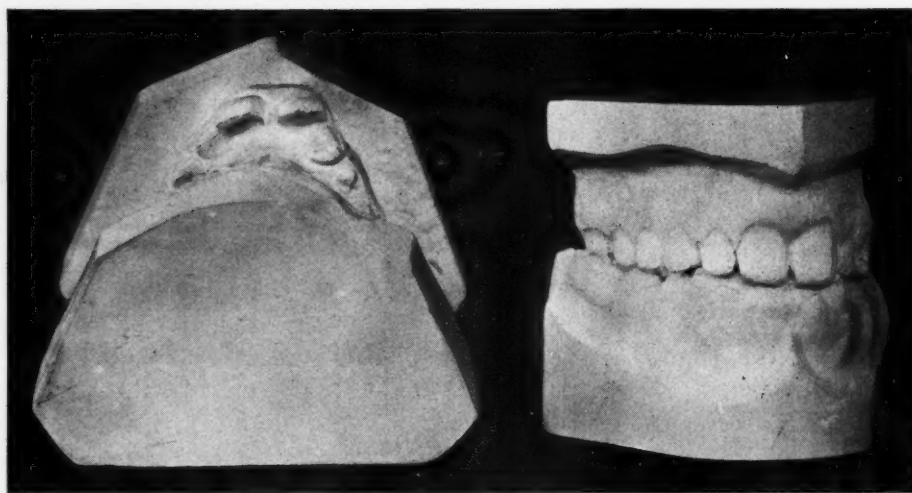


Fig. 12.

that movement. We would not advise as rapid a movement as occurred in this case, and do not encourage students to move teeth rapidly, believing that a slow movement is much better for all cases. The result of the treatment is shown on the right-hand model of Fig. 9, while the improved facial

profile of the patient is shown in Fig. 10. By treating this case at the time we did, the great facial deformity was overcome and the malocclusion corrected, which in all probability would have been progressive and become much more extreme as the patient became older.

Case 6.—Fig. 11 is a photograph of a girl 14 years of age, with a case of Class II. The upper first permanent molars had been extracted. Treatment was begun in 1913 and finished in 1914. The patient had adenoids and was a mouth breather; the adenoids were removed before the treatment was begun. The models on the left of Fig. 12 show the occlusion of the teeth before treatment. Clamp bands were adjusted and cemented to the upper and lower permanent molars, and the upper alignment wire was adjusted so



Fig. 13.

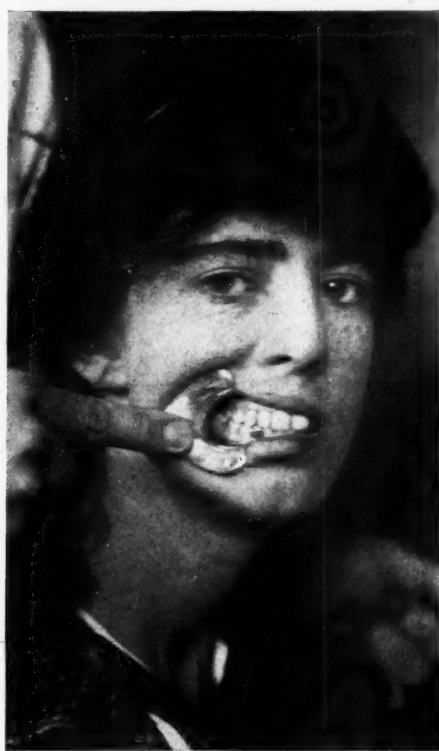


Fig. 14.

it rested against the upper central incisors and stood away from the premolars and canines slightly in order that those teeth might be expanded. The nuts on the upper alignment wire were kept away from the tubes so that during the process of expansion of the premolars and canines the upper incisors could be carried distally. The lower alignment wire was adjusted so as to produce the necessary expansion with the teeth ligated to the lower arch. Intermaxillary anchorage was used, which retracted the upper incisors as the canines and premolars were expanded. When the upper incisors were retracted to a sufficient degree to produce a normal-shaped upper arch, the nuts on the upper alignment wire were allowed to rest against the tubes on the molar bands and pitting all of the upper teeth against all of the lower teeth, thereby bringing the lower arch forward without displacing the upper per-

manent molars. The result of the treatment is shown in the left-hand model of Fig. 12. As a result of the treatment, the occlusion was made more efficient and the health of the patient has been much improved since the work was done. The retention of the case was the same as described in Case 4. Fig. 13 shows the improvement of the facial profile, and it will be seen that



Fig. 15.

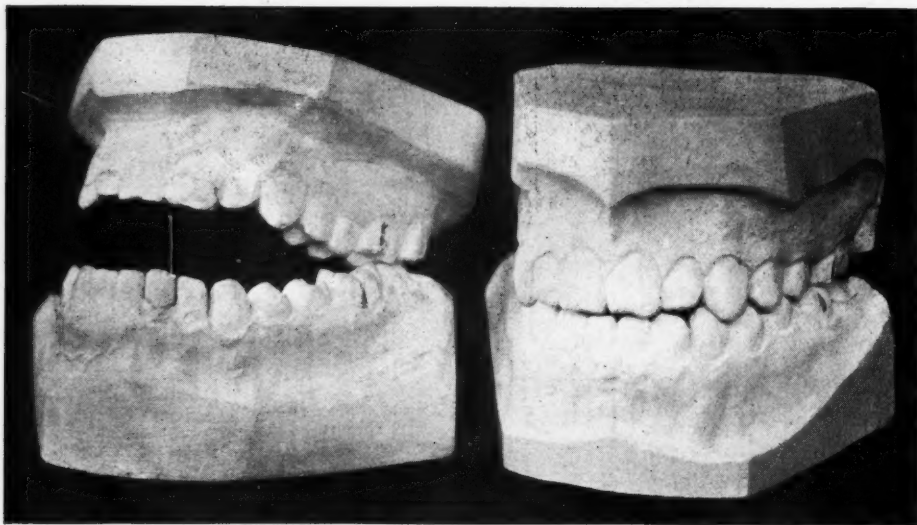


Fig. 16.

the mandible is very much developed, there is an increase in width in the region of the nose, and the entire facial outline is very much improved. There is still a slight stretched expression about the lips, which is very often the result in these cases, as the upper lip, having been underdeveloped and unused for so many years, has not yet fully assumed its normal function. Fig. 14

not only shows more or less of the profile of the patient, the well development of the mental eminence of the chin, and the proper shape of the mandible, but it also shows the occlusion of the molars when the teeth are closed. The result obtained in this case is very gratifying and we believe it is far superior to anything that could be obtained by any other line of treatment. By the method of bringing the lower arch forward the entire distance and not moving the upper molars distally, we produce a better development in the mandible and a better balance in the face than is produced by that plan of treatment where there is a harmonious condition established between the molars rather than by establishing the absolute normal position of the lower teeth. This case also shows that even at 14 years of age, if properly treated, the mandible will still develop to a great degree,—in fact, to its normal size, as we believe it did in this case.



Fig. 17.

Case 7.—This patient, a girl 15 years of age, possessed a Class III case of malocclusion; infraocclusion of the incisors fully one-half an inch. The position of the teeth and the molars when closed is shown in Fig. 15, and the models of the case are seen on the left of Fig. 16, which illustrates the mesio-distal relation of the arches at the time treatment was begun. Clamp bands were placed upon the upper and lower first molars, adjusted and cemented. Plain bands were placed upon the upper incisors with spurs on the labial surface to support the alignment wire from slipping occlusally. An intermaxillary hook was placed in the region of the lower canines to use as intermaxillary anchorage in moving the lower arch distally. An intermaxillary hook was also placed in the region of the upper canines to receive an intermaxillary rubber extending from the lower canine to the upper canine to overcome the infraocclusion. By the use of the intermaxillary rubbers, as described in the third case, the teeth were moved to such a position as shown on

the right-hand model in Fig. 16. This change was produced in 15 months; the change in the patient's profile as the result of the treatment, is shown in Fig. 17. This is another case that would have been progressive if allowed to continue, and one when treated, as mentioned above, has produced a facial result which is a great improvement over what we formerly had, and, it is needless to say, was greatly appreciated by the patient. The improved masticating apparatus, as seen by comparing the models in Fig. 16, can not help but be a great benefit to the patient and have a great effect upon the general health of the individual.

Case 8.—The models shown in Fig. 18 on the left-hand side, are those of a girl 16 years of age who had a Class II case of malocclusion. The upper incisors were bunched, which made it necessary to adjust bands to those teeth with a spur on the disto-lingual angle of the band to engage a wire

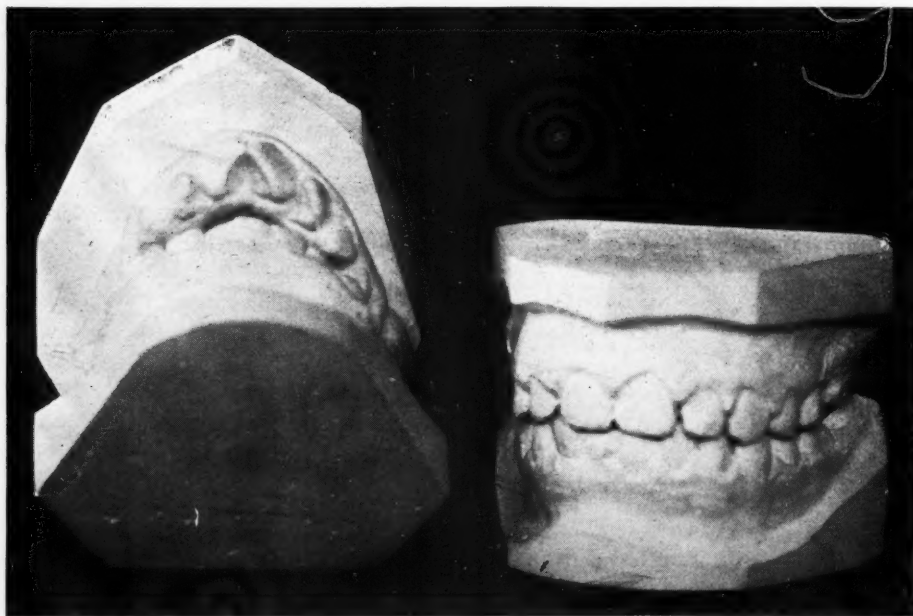


Fig. 18.

ligature so as to rotate the teeth. The regular clamp bands and alignment wire was used on the upper and lower molars, with intermaxillary hooks attached to the region of the upper canines for intermaxillary anchorage to be used in moving the lower arch forward. After the upper arch was expanded and the incisors placed in their proper positions, intermaxillary rubbers were used to correct the mesio-distal relation of the arches. The retention used in this case was the same as employed in the first case, and the finished result is shown in the right-hand model of Fig. 18.

We believe the results shown in these cases are very gratifying, and demonstrates that if the proper plan is pursued it is possible for students to treat malocclusion in dental colleges. When a patient has been assigned to a student to have his teeth corrected, the mouth is first placed in a healthy condition by doing all the necessary filling and cleaning. The student is given a step card on which the record of the case is kept. When he takes

the impression, if it is satisfactory the instructor in charge marks his card. The same procedure is followed when bands and models are made, and before the bands are cemented in place. By this method, from beginning to end, every step is inspected and marked before the student can go ahead. This gives us definite results and definite records of what is being done. If any one step is wrong, the student makes the necessary corrections. The patient, student, and instructor are marked present on the average of practically every hour, so that a record is kept of all interested in the case. The instructor being present with the patient, gives the student instruction in every case; the student does all the work. By this method, we have found that it is practical for students to do orthodontia. When the boys graduate, and have treated successfully cases like the above, and have seen over 100 other cases, they will have no trouble when they enter upon practice in treating the simpler irregularities. Even the poorest will at least recognize the abnormal cases, and can advise the patient to go to a specialist if he does not care to correct the case himself. Many students may not care to do orthodontia after they graduate, but their dental education would not be complete if they had not, while at school, received the course of training in this very important subject—orthodontia.

JURISPRUDENCE.

The Introduction of Communistic Theories of Government into our Individualistic System.

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THERE are two distinct theories of society or government which, for the want of better terms, may be designated as (a) the communistic, and (b) the individualistic.

In the communistic theory the community or State is the unit and in it the right of all its members are centered; in fact the individual derives his rights from the aggregation. He has no personal rights except those which are conferred upon him by concession of the community and no political rights except such as are conceded by the body politic. No one comes into the world and finds himself in a state of nature. Society in some form of development is already there and he finds himself immediately subject to its regulations. As the community existed before he came and will continue to exist in the infinite æons of time after he has gone, it cannot necessarily have been dependent upon him for its existence or its power. In fact the little part he plays upon the stage of existence is but a mere incident in the perpetual life of the community into which he happens to be cast. The duty, if any, of the community towards him depends entirely upon the effect of his presence upon that community. If only a burden it may be too great

to bear and the Tarpeian rock ends the incident. He is entitled to nothing as a matter of right, not even to existence, if it is to be at the expense of the lives of others, and all the recognition he gets is merely by way of voluntary gift from the community of which he is permitted to form a part.

In the individualistic theory of government, the individual is considered the unit of right and power. According to this theory you can no more construct society without regard to the rights of man than you can construct a building without reference to the properties of the materials used. Bricks constructed into an edifice have merely changed their relation to each other without losing any of their original properties. They still have extension, form, weight, color, impenetrability; so the collection of human beings into families or communities, while changing their relation to each other, does not change the inherent rights of the component members. As the edifice derives its form, dimensions, appearance and characteristics from the indestructible properties of its component parts, so the social organism depends for its existence, its vitality, its rights, upon the inalienable, indestructible and ever-assertive rights of the individual. There are many obligations and duties pertaining to the person which the experience of the ages teaches should be left to the discretion and absolute will of the person and it is only when their exercise is fraught with weal or woe to society that the latter is justified in exercising a curb upon the former. The *man* is more important than the *citizen*. He is not a mere inanimate object placed by fate in the social organism without ambition or power to change his relation to his surroundings, but a living unit of dynamics in thought and force which has the inherent power and right to create and control its relation to the community life into which it is projected. To him citizenship is an inherent right with which he is endowed by his Creator,—not a gift bestowed by the State.

The one theory considers the completed structure; the other the individual parts. According to one theory man is predestined to a place in a social organism with little right or power to shape or determine the part he will play in its life and activities; according to the other theory he is endowed by his Creator with the inalienable rights of life, liberty and the pursuit of happiness, and the state must demonstrate its right to control his conduct by its ability to control, to his advantage and welfare, the general conduct of the community. If he surrenders any freedom of action it is to receive a *quid pro quo* in increased security and opportunities for the enjoyment and use of his faculties. These are central ideas around which the respective civilizations develop and through which they find expression. They have a remote parallel but not a synonym in *local* and *centralized* government. It is not our intention to make any extensive comparison or contrast of the relative merits of the two theories nor of the governments which are evolved through them. Suffice it to say that both have their merits and both represent influences to be avoided. There are dangers in both directions. The extreme assertion of the rights of the individual would mean anarchy and chaos, with selfishness as the only incentive to action; the extreme type of the communistic idea would be a despotism with slaves as subjects without thought of individuality or personal initiative. The highest expression of civilization must necessarily combine features of both theories.

Men think; communities feel. Men are active, communities passive.

Genius is an individual trait. Mind may work in harmony with other minds but they have no interdependence; they may co-operate but they do not coalesce; they may strive for the same end but their energies are not cumulative. A million pairs of eyes may be directed to the study of the splendors of the starry heavens, but they do not represent accumulated power, as each pair is directed and controlled by only one mind. Mental co-operation is largely successive,—not contemporary. An army represents the aggregate physical force of all its members but its mental force is expressed and circumscribed by the one mind which controls its movements. The aggregation, army or community, may be a unit of might but it is not a cumulative dynamic unit of thought. It cannot have a force superior to the highest intelligence among its individual membership, and may in fact be controlled by its lowest intelligence. You cannot unify and cumulate thought as a dynamic force. With all your combinations each mind remains a unit. In all things where mentality is the controlling factor,—in the realm of thought—the individual must be the unit, and in these fields of endeavor he must be recognized as superior to the community. All progress in the world, all achievements in the new fields of thought and action have come from individual initiative and endeavor, but on the other hand the conservation of what has already been attained, the application of the greatest effort to a definite purpose, the realization of the greatest good to the greatest number have been effected only by combination. That individualism is wasteful of the world's energies and resources cannot be gainsaid, but it must also be admitted that communism too may be misdirected and lack definite aim, while whatever initiative it may have it must necessarily derive by and through its component members.

To understand and appreciate the effect of these theories upon the development of social, political, commercial and industrial institutions, we must look to the controlling motives of human actions. Individual assertiveness in community life is only a manifestation of the instinct of self-preservation. The conscious ego attempts to influence the conditions affecting it in its surroundings in a manner most conducive to its welfare and resists any influence which appears to be inimical to its well-being. All other considerations are subordinate to the duty to maintain life with liberty and its accompanying comforts. But this same law of existence applies to community life; therefore, the community also must resist extinction—yea even any encroachment which seriously threatens its welfare or the welfare of its members. Here is where the conflict begins. The wisdom of the ages has been exhausted in the effort to harmonize these contending forces. On this field have been waged the great battles of the law whose supremacy has been won over individual selfishness, ignorance and foreboding. *Thou shalt not* runs, to the individual, the order of the State and the mandate of the Most High. At every point the individual is touched by the spirit of that super-individual the community life. However, on the other hand this pertinacity of human nature has prevented any permanent encroachment upon the rights of the individual which was not clearly demonstrated to be essential to the public safety, but since the whole is greater than any of its parts, the rights of the community must prevail over those of the individual whenever and wherever an irreconcilable conflict arises between them.

In any form of social organization the individual must surrender some rights and submit to some degree of control over his conduct (with a like surrender and submission by others) for the benefit of the entire community. Revenge for a wrong, either real or fancied, is sweet to the avenger, but it usually has a recoil which, in the end, may take all its sweetness away. Sometimes the injured party may be physically inferior to the wrong-doer and unable personally and alone to redress the injury. Here, as in many other instances, the individual receives a *quid pro quo* for what he surrenders; in fact, the compensating advantages received by him are often infinitely more important to his welfare than his contribution to the common cause by way of rights surrendered. Where the individual is clearly benefited by the surrender of or not claiming the right, both theories of government or social organization agree in their development. Limitations on the activity of the individual, which are clearly for his benefit, are as common to one theory as to the other, but where the benefit to him is uncertain or not apparent and immediate, the disparity begins, and in cases where the benefit, if any, appears to be in favor of the organization, or where no benefit to either is manifest, the spirit of the individual, who has any notion of independence or any red blood in his veins, resists the encroachment upon his rights and rebels against the restriction. In these particulars is where you find the characteristic differences in the development of institutions under the two theories. In the communistic theory, where there is a restriction on personal activity, the question is never more favorable to the individual than, "Is the limitation or control reasonably promotive of the public welfare?" In the individualistic theory the question is, "Is the limitation or control necessary or indispensable to the public welfare?" The one asks, Is it beneficial to the community? The other, Is it beneficial to the individual affected.

The more nearly the maximum resources of nature are consumed in supporting the people of a community or state the greater the control thereof, which must be assumed by the body politic, and in extremities all individual control must be eliminated. In a fertile country, with a population of only a few inhabitants to the square mile, the control over natural resources may be left entirely to the individual, subject only to such limitations as are automatically imposed by the laws of free competition and natural supply and demand, but where a population of hundreds of inhabitants per square mile must be supported from the niggardly resources of an exhausted soil, all rights of the individual in reference to the control thereof, may necessarily merge in the community dependent thereon. In the former instance the right of dominion of the individual may be absolute and unlimited, except by his own capacity for use or destruction, but in the latter situation he may be limited to the right to use and consume, and that use and consumption may be confined to an amount reasonably necessary to maintain himself and those dependent upon him, in a manner consistent with the rights of the community and most conducive to the public welfare.

Of course, there is no typical example of either form of civilization or government, as both theories have struggled for mastery and each has left its imprint on every community in the world's history. In some countries one theory predominates, and in other countries the other theory is paramount, but neither has at any time or place entirely excluded the influence

of the other. The underlying causes of the individualistic theory are necessarily present wherever men are found, and their conflicting interests very readily produce the occasion for the assertion of the other theory. Continuous has been the struggle between organized society and the ever assertiveness of individuality, and that or this has prevailed according as necessity drove men into combinations or the boundless opportunities of virgin territory tempted them to independence and personal initiative. However, as soon as an equitable distribution of nature's bounty—a distribution not based on the doctrine,

"They shall get who have the power,
And they shall keep who can,"

but on the principle of the greatest good to the greatest number—becomes indispensable to the welfare of the masses, the individual must submit to a certain degree of merger into the community and the rights of the latter become paramount.

Where the individualistic theory predominates there is a tendency to regard government as a restriction on the rights of the individual and, therefore, to treat it as a power to be opposed. Man rebels at restraint. Herein lies the explanation of why government under such conditions is regarded as a necessary evil and why the visible expression of law in the form of the policeman is often looked upon with disfavor.

According to the philosophy of our civilization the individual represents the unit of right and power, whereas in the communistic theory the family or the community, or possibly the nation, is regarded as the unit, and the will of the person is subordinate to this super-individual.

Our civilization and, consequently, our jurisprudence have developed along the line of the idea of the independence and pre-eminence of the individual. With us, the source of governmental authority is the will and choice of the people, and it is our theory that law derives its force and effect from the consent of those upon whom it operates. According to our theory the individual existed before the family; the family before the community; the community before the State or Nation, and all these exist for the welfare of the individual; that in their ultimate analysis all laws, whether of the family, the community or the state, contemplate the individual welfare and never lose sight of his rights and wishes. The maxim in our jurisprudence is, The greatest degree of personal liberty and initiative consistent with the orderly and effective administration of the functions of society or of the affairs of government. Illustrations of the influence of the individual in the development of our laws may be found at any point in our history.

The doctrine of caveat emptor is an illustration of how individuality asserted itself in the earliest periods of English development. The trader resented the right of the community to place a limit on the praise he might bestow on the article he was seeking to sell or exchange, and the courts, true to the principle that the other party may be expected to take care of himself, protected him in his panegyrics. Any curtailment of his license in this respect would have amounted to an interference with his right of contract—a right which has always been regarded by our English ancestry as essential to our liberties and which our forefathers magnified to

the extent of ingrafting it into the fundamental law of the land. However, even the casual observer of the tendency of the times must have noted with gratification the general movement in legislation and court decisions to protect society from those who seek to impose upon public credulity by means of false, exaggerated and misleading representations through the medium of advertisements and through the sale of impure foods and drugs and the misbranding of such articles. Even our courts, which should be the last institutions to be affected by the innovations of progress and experience, are gradually taking the civil-law view of the subject, and the harsh doctrine of that highway robber of the common law, *caveat emptor*, is gradually being replaced by a system founded on an enlightened conscience and public welfare. Formerly, the expression of a false opinion was not regarded as actionable either at law or in equity. But this condition has changed. "It is a fraud for a practitioner to pretend, to the detriment of his patient, that he can cure or alleviate a disease when he knows he cannot; or that his patient is improving when he knows, or ought to have known, that the trouble is not being relieved; or that he understands the nature of the malady, when in fact he is ignorant thereof."¹

Even the criminal was protected against the society he had wronged, by placing the burden upon the latter in any effort to convict him of his offense and bring him to punishment. He is entitled to a presumption of innocence, and that presumption abides with him until by competent evidence he has been proven guilty of the offense as charged beyond a reasonable doubt. "Better that 99 guilty escape than that one innocent should suffer," runs the slogan. The individual was more than 99 times as important as the community. One man can commit a crime but it takes the unanimous verdict of twelve men to establish his guilt. He must be confronted by all witnesses who appear against him; that is, all cards must be on top of the table, and some courts practically require that they must be turned face up and played as required by the criminal. The taxable costs in litigation are never adequate to compensate the wronged party for his trouble and expense, thus, practically encouraging resort to courts to settle differences and to assert personal independence.

Notwithstanding the preponderating influence of the individualistic theory of government in the American colonies at the time of their organization into one union, there were ingrafted into that government many features of the other theory. As an example we may cite the establishing, at public expense, of post office and post roads and, soon thereafter, of systems of public free schools and internal improvements.

In fact from the earliest establishment of order in our system of jurisprudence the supremacy of the state over the individual in matters pertaining to the comfort, morals, order, peace, safety and welfare of the public has been recognized in what is indefinitely called the police power. The courts have not attempted an exact definition of this term but the central idea is that it is a right lodged in the community as a whole to regulate and control the action of its individual members in all matters wherein the rights of the public in relation to the matters aforesaid are concerned. "The police power is that inherent and plenary power in the state over business and prop-

1.—Brothers: Medical Jurisprudence, p. 197., C. V. Mosby Co., 1914.

erty, when expressed in the legislative will, which enables the people to prohibit all things inimical to the comfort, safety, health and welfare of society and is sometimes spoken of as the law of overruling necessity."²

This is a latent power which will always be called into active being whenever the occasion for its exercise arises and the tendency in the direction of enforcing the rights of the community as against the rights of the individual is shown in the repeated application of this doctrine of the police power.

While in English-speaking countries, especially in the United States, the individualistic theory of government has its highest development, yet even into many of our contractual relations the law has injected duties and benefits not always contemplated by the parties themselves. Take the marriage relation as an example: Irrespective of what the parties to the contract may have had in mind, they immediately become incompetent of occupying a similar relation towards any other person in the world, and the incompetency continues until the death of one of the parties or until the relation is dissolved by due process of law for cause specified by the law. It cannot be dissolved by agreement of the parties themselves. The husband is bound to support the wife and both are bound to support their off-spring, and the law assumes to interfere with any effort on the part of either to interfere with the course of nature in the production of off-spring. Subject to certain limitations, "Where the husband furnishes the flour the wife must bake the bread." Each spouse acquires a contingent interest in the property of the other. Some of these provisions are intended for the benefit of the individual spouse and others are intended for the benefit of the social community.

A great deal of the so-called industrial and progressive legislation and agitation of the last few years is a movement in the direction of the communistic idea of government, in an effort to implant into our industrial and social fabric some of the results of that theory. The agitation is perhaps accentuated by reason of the large influx from the populations of continental Europe, where the latter theory predominates. Changes of such fundamental character should not be undertaken without the fullest consideration of their ultimate effect on our industrial and social system. Illustrations will readily occur to the reader, but reference to one will suffice to explain our meaning,—the so-called old age pension system. If, in his decrepitude the individual is to reap the benefit of provisions made possible by the communistic organization of society, should he not in his maturity bear some of the burdens of that form of organization, whereby the payment of the benefits is made possible? We cannot eat our cake and have it too. If we expect support from the community or government we must give a *quid pro quo* by contributing our proportion to the fund from which, in time of need, that support may be drawn. If we expect the benefits we must bear the burdens. If we persist in treading the "primrose path of dalliance" in our youth and manhood we must not expect too much when the fires of passion have gone out. We must not apply one theory of the relation of the individual to the community during his effective manhood and a different theory in his useless decrepitude. The question is—Are we ready to surrender any portion of

2.—Brothers: Medical Jurisprudence, p. 272.

that personal independence which has been the boast and crowning glory of our social organization?

There is no disputing the fact that such a system in its entirety, has the essential element of justice by making each mature generation take care of itself. In our present system each generation is taxed with the support of the immature of the coming and the derelicts of the past generation, and the burden is generally, specifically, imposed according to relationship. If we are to change the system we ought to change the theory. If we want such an innovation we must pay the price. To be entitled to the profit we must make the investment. It is desirable further to control individual action by *compelling* men to work, economize and save against the exigencies of the future?

In the relation of the individual to the community or state, from the earliest times, our law has imposed upon every individual certain duties and responsibilities for the welfare of the community; among which may be mentioned the duty to use reasonable care and caution not to injure others by his acts. By reason of the congestion of individuals into thickly populated communities this latter duty may so circumscribe the individual by restrictions as to leave him almost without any personal initiative. The relation of members of any of the professions to those with whom they deal is impressed with many obligations not contemplated by the parties at the time. The exercise of skill, care and judgment are indisputably presumed to be engaged for in all the professional man undertakes to do, and the law will not permit him by special agreement to relieve himself of that burden. What the law imposes for the benefit of the public, the law only can relieve. Speaking of the professions, it is in the subject of the right of the individual to practice a given profession that there is gradually being wrought in our jurisprudence the greatest limitation upon the rights of the individual.

"At common law any one might practice medicine or dentistry or perform surgical or dental operations. No preliminary preparation and no license to practice were required as a matter of law. This condition was also true on the continent of Europe within the jurisprudence of the civil law. Of course the practitioner was responsible to his patient for the exercise of an ordinary and reasonable degree of skill and knowledge, as measured by the standard of proficiency and professional learning at the time; but the State did not then attempt to prohibit incompetent persons from practicing nor to regulate the standard of proficiency by establishing a minimum standard of qualification. To adopt and follow such lawful pursuit, not injurious to the community, as he may see fit, is a fundamental right and privilege of every American Citizen."³

However, as is said by Justice Field in *Dent against West Virginia*, 129 U. S., 114, 121, "the power of the State to provide for the general welfare of its people authorize it to prescribe all such regulations as may be and are necessary to secure the people against the consequences of ignorance and incapacity as well as deception and fraud."

"The public welfare requires not only competence in the practitioner but also morality, general uprightness, respectable appearance and reasonable obedience to law. A grossly immoral or criminal practitioner is more

3.—Brothers: *Dental Jurisprudence*, p. 103.

dangerous to society than one who is merely incompetent and, therefore, good moral character and a record free from crime are universally required of applicants, and the courts have universally held such provisions constitutional. While such laws are an invasion of the common law right of the individual, they are justified on the ground of public necessity. Ordinarily the law cannot interfere with the freedom of private contract. Why should the citizen not be permitted to engage whomsoever he pleases to administer to him when he is sick or relieve him of dental troubles when they assail him? The answer is, *The public must protect itself against imposters, fakers, charlatans, ignoramuses and quacks.*"⁴

If we are to adhere to our individualistic theory of government and not entirely obliterate the individual in behalf of the state, a restriction on the person to practice a profession should have some reasonable relation to the objects to be attained. Any restriction or control over the individual in this respect should appear to have in view a reasonable promotion of the comfort, good manners, health, life, morals, order, peace, safety and welfare of the citizens of the state.

"The requirement that an applicant for examination for license to practice must be a graduate of a college or school or some particular class of school is not only unreasonable and unjust but also not reasonably promotive of the object to be attained—the selection of fit and competent persons. How or when, or where, or within what period of time the qualifications were attained, are matters in which the public is not concerned. The only test should be,—*Is the party competent, worthy and fit to practice the profession?* What he has, not where he got it, should be the subject of inquiry. What he can do, not where he acquired the ability nor how long it required him to attain proficiency, is the element of public interest and inquiry. A requirement that a party must be a graduate of a particular college or particular class of college, is unfair discrimination which the public should not tolerate. It excludes the competent citizens who acquired their information in other schools or by private tuition and instruction. It does not answer the objection to say that the requirement excludes only the incompetent, that is, only those who cannot stand the required test as to proficiency. The existence of the rule presupposes the contrary. If such rule excludes only the incompetent then why not eliminate them by the usual examination—the same process by which other incompetents are excluded. If present standards and methods of examination do not eliminate all incompetents then better change the standard or the method of examination. The trouble is, the limitation in question is intended to get rid of, not the unqualified, but a class regardless of qualification and fitness and, as such, is an unjustifiable exercise of the police power."⁵

However, it must be admitted that some legislatures, and also some courts, have overlooked the origin of the right to restrict and control the individual in these respects and have passed and sustained many restrictions and regulations which are not primarily promotive of the public weal and, therefore, in view of the tendencies above indicated it would be folly indeed to attempt to predict how far our courts will go in sustaining legislation which

4.—Brothers: Dental Jurisprudence, p. 105.

5.—Brothers: Dental Jurisprudence, p. 106-7.

has for its apparent purpose the protection of the community by restricting and controlling the action of its members in their occupations and professions.

The tendency of legislation towards the protection of society against the individual is further illustrated in the multiplicity of the laws prohibiting the advertising of cures or remedies for certain diseases and ailments, usually those of a venereal character, and making it unlawful for a person to advertise himself as a specialist in the treatment of such diseases. The reason for such legislation is forcefully stated by the court in a recent case in Oregon as follows:

"For many years it has been recognized by publicists and legislators that some drastic action is necessary to check the social evils and to protect youthful and inexperienced humanity, not only from easy access to vicious and immoral practices, but also from the schemes of designing men who for the sake of financial profit would pray upon the calamities of the unfortunates who have sowed the wind and reaped the whirlwind * * * * *. The act spreading broadcast, by means of advertising, the idea that certain venereal diseases are easily and cheaply cured is against public policy, in that it has a decided tendency to minimize unduly the disastrous consequences of indulging in dissolute action * * * * *. The purpose of the act is clearly in the interest of the public morals."

Legislation prohibiting the advertising of liquors in dry territory has been upheld as being within the police power and reasonably promotive of the public welfare. The fact that in practice such regulations discriminated against the people of the State was not sufficient to invalidate the law.

Industrial legislation pertaining to hours and conditions of labor, safeguarding the life, health and morals of employes, minimum wage, employment of minors and women, form of payment of services, and many other kindred subjects, is promoted and sustained by the fact that the welfare of the community is the paramount consideration in industrial life, and that the rights of the individual must be made to harmonize with the requirements of the public. The tendency toward compulsory attendance at school is another form of the assertion of the rights of society over the individual and is an assumption by the State of some of those responsibilities which have heretofore been placed exclusively upon the individual parent or guardian. However, in the complex relations of individuals when congregated into large municipalities is where we find the greatest regulation and control of the individual for the welfare of society. The paramount interest of society is the basis of the law announced by the courts whereby charitable institutions are exempt from responsibility for the negligence of their servants causing injury to their patients. For the same reason the sovereign State is excused from liability for the torts of its employes or servants in their governmental capacity.

The assertion of the supremacy of society over the individual and the regulation of his energies for the common welfare is seen in requirements pertaining to the services of medical practitioners for infants afflicted with disease. Even religious scruples must give way to the prevailing sentiment of the community notwithstanding the disease may be of such character as to affect only the infant afflicted. "The law is based upon the assumption that the medical services were a necessity and applies wherever the party

sought to be held responsible is charged with the duty of supplying the minor with necessities."⁶ It has been held that the parent is criminally liable for refusing to consent to a surgical operation upon his minor child.

It may be safely predicted that the time is not distant when parents, guardians and others to whose care the law commits the young will be required, under penalty, *to have the defective jaws and mouths of their wards treated and corrected by the orthodontist*, in cases where such treatment will conduce to the health, comfort or happiness of the ward.

A PLEA FOR CONSERVATION OF THE CEMENTUM.

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THE object of this paper is a plea for less heroic instrumentation and greater conservation of the cementum on the roots of teeth affected by pyorrhea alveolaris. When a failure of union between the peridental membrane and the root of the tooth occurs after heroic instrumentation has been instituted, it is not because the peridental membrane has been removed in its entirety, for, on scaling the roots of the teeth, only the ends of the fibers attached to the cementum have been cut and partially removed, while the fibers of the alveolar surface are often intact. The failure of union results because the operator, in his heroic scaling, has removed the basal layer of the cementum, and the dentin of the root of the tooth is exposed. Even if a few islands of the cementum are left on the root of the tooth, the area of destruction of the cementum is proportionately so great that the remaining cementoblasts (or lacunæ) are unable to regenerate the cementum to such an extent as to replace the destroyed cementum.

The popular teaching at the present is that the peridental membrane carries in its substance the cementoblasts and that the development of the cementum is dependent on the peridental membrane. This teaching the author believes is not correct, for the reason that the peridental membrane histologically is an exact counterpart of the periosteum. One needs to do nothing more than examine a slide made from a section which shows the root of the tooth *in situ* in the alveolus to be convinced that such is the case. And further, the author believes it is impossible for one to place the pointer of the eye-piece at a definite point, and state that the tissue at one point is peridental membrane, while that at an adjoining point it is periosteum, for histologically there is no evidence on which one can make an actual differentiation. In lieu of the work done by MacEwen of Scotland, in which he shows, by experimental evidence, that the periosteum does not carry osteoblasts in its substance, and further that the function of the periosteum relative to the formation of new bone is that of a limiting membrane; the author, in his examination of a large number of slides of sections which he has made of the root of the tooth in the alveolus taken from the human mouth in the

6.—Brothers: Medical Jurisprudence, p. 263.

morgue, has not, up to the present, observed any free cells in the substance of the peridental membrane in the vicinity of the cementum, which morphologically resembles the cementoblasts described by Black and Noyes. The peridental membrane, the author believes, is a limiting membrane for the cementum and the alveolus. Vitally, the fibers of the peridental membrane have a direct affinity for the cementum and if the cementum is absent the fibers do not find a surface which is adapted to their need, and no union occurs. The fresh surfaces produced by instrumentation offer the epithelium of the mucosa of the mouth an excellent field for their growth, and after variable periods of time they creep over the margin which separates the epithelium from the periosteum (Fig. 1) and soon commence a natural process of growth, forming a covering for this surface. The fibers of the peridental membrane near the cementum are absorbed, and the alveolus in this area is now covered with a tissue composed externally of mucous membrane, and internally of

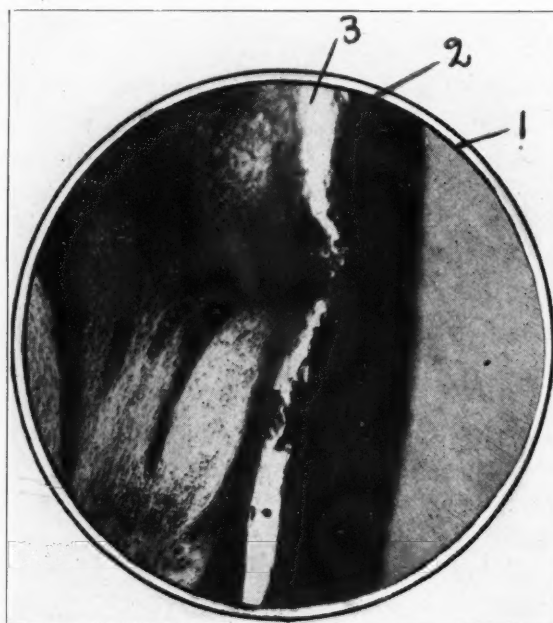


Fig. 1.

peridental membrane. Of course, when this process occurs, we cannot expect a union of the fibers of the peridental membrane with the root of the tooth. The normal arrangement of the fibers of the peridental membrane and their relation with the gingivus is shown in Fig 2. At (1) we see the fibers of the peridental membrane attached to the cementum, which is the small black area at the left border of the picture. At (2) we see the tip of the alveolar border and at (3) the periosteum of the alveolar process and the manner in which the fibers of the peridental membrane are continuous with the fibers of the periosteum, as has been shown by Noyes. By comparing Fig. 2 with Fig. 1, the difference between a healthy gingivus and a diseased one can be seen.

The periosteum regenerates when it is destroyed. Marchand and others have reported this, and it is now accepted as a fact. If, however, suppuration and infiltration of the outer tables of the bone occur by suppurative organ-

isms, necrosis is inevitable. The necrosis, however, does not cause a total destruction of the periosteum and according to Marchand, the following condition is found. The new periosteum, in its growth, becomes firmly attached to the bone, and is separated from the overlying connective tissues. The old periosteum shows a marked thickening of its fibers, which are ar-

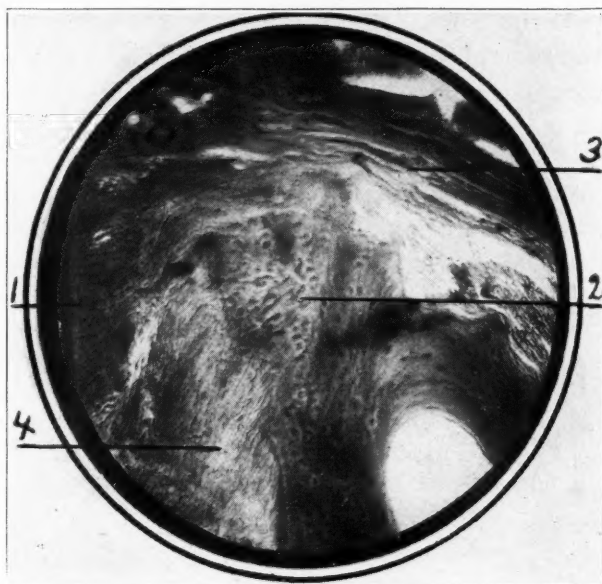


Fig. 2.

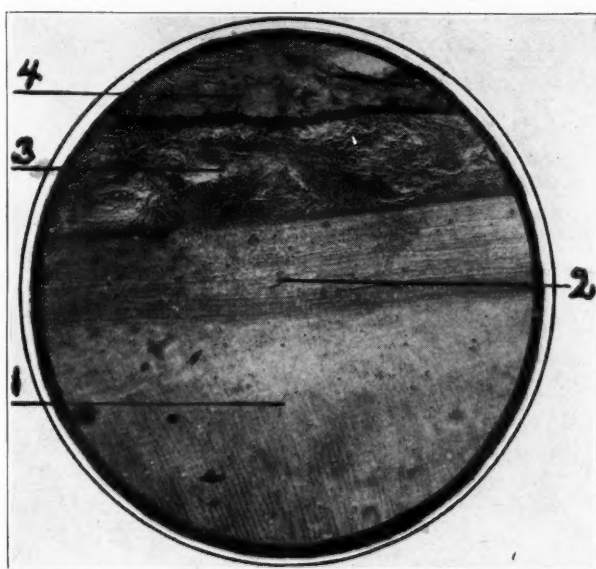


Fig. 3.

ranged along the long axis of the bone. They exhibit a radial development and suggest a definite growth of the fibers from the periphery. The author, believing as he does that the periosteum and the peridental membrane are one and the same tissues histologically and functionally, is of the opinion that when the peridental membrane is destroyed by instrumentation or

disease in a given area, and this area is not covered with mucous membrane, that the peridental membrane will regenerate the same as the periosteum regenerates. And further, if the basal layer of the cementum has not been destroyed, the basal layer will regenerate the cementum, and that a union of the peridental membrane with the cementum will occur. Clinically, the author has seen many instances where a union of the peridental membrane with the root of the tooth has occurred, and this evidence he has shown Drs. Dewey, Allen, Evans, and Lobenstein.

The cementum of the root of the fully developed tooth, when examined with the high power, shows lacunæ and canaliculi, which, histologically, are the same as the lacunæ and canaliculi of the alveolus; but the cementum of the root of the tooth differ from the alveolus in that a complete haversian system has not been demonstrated. This, however, may be the fault of

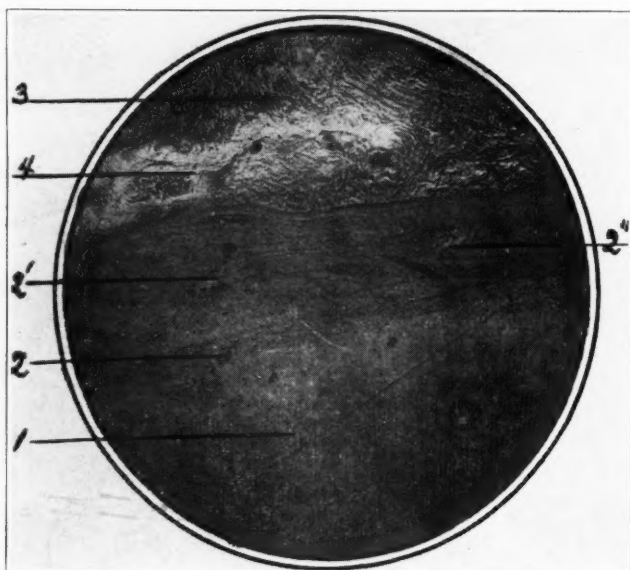


Fig. 4.

technic, or our inability at the present time to connect the canaliculi with the surrounding tissues.

The author believes the cementum laid down in the process of the development of the tooth the same as any other part of it.

The cementum, being an exact counterpart, histologically, of bone, it is rational to assume that, like bone, this tissue regenerates the same as bone does, and again we must refer to the work of MacEwen in which he states that bone regenerates in one of two ways, namely: "In adult life, regeneration takes place either through a transitional stage of cartilage, or by direct division of bone cells into osteoblasts. Where the conditions are most favorable, the osteoblasts are formed directly from the bone cell and ossification is hastened; but when conditions are less favorable, the cartilage cell is formed, and ossification is retarded."

In the next picture (Fig. 3) we have a cross-section of the root of the tooth including the alveolus. Beginning at the dentin (1) and passing

upward we note the cementum (2), and it will be seen that the cementum at this point is laid down in concentric lamella. The cementum (2) in this picture is laid down in uniform thickness and likewise density. Continuing upward in the picture, we note that between the cementum (2) and the alveolus (4) the peridental membrane (3), which, like the cementum, is uniform in its thickness between the cementum and the alveolus. At the left, in the peridental membrane, we note a light area, which in all likelihood, is a focus of disease of the peridental membrane. The alveolus (4) shows some lacunæ, and in this area is approximately normal. By studying this picture we become oriented as to the relation of the dentin, cementum, peridental membrane, and alveolus. This picture, the author believes, represents the normal relation of the root of the tooth and its dependent tissues.

The normal tension of the peridental membrane is present in Fig. 3, while, as we advance to Fig. 4, we find that such is not the case. In Fig. 4,

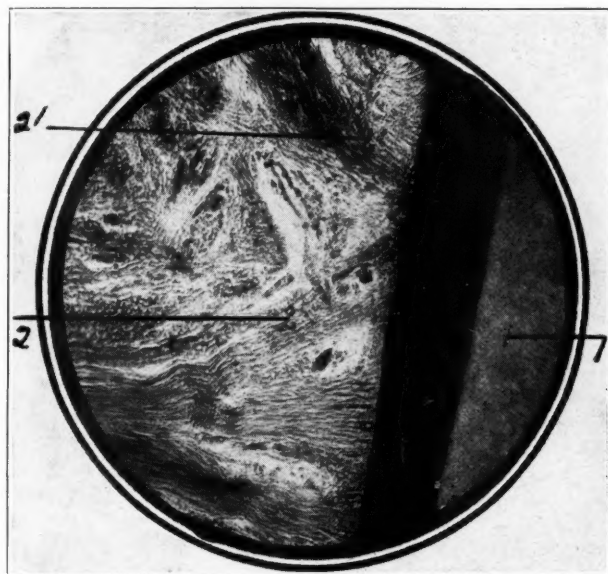


Fig. 5.

beginning at (1), which is the dentin, and advancing upward to (2), we observe the granular layer of Tomes. Continuing upwards, we observe the cementum proper above the granular layer of Tomes (2, 2¹, 2¹¹). By comparing the thickness of the cementum (2¹) to (2¹¹), we note at once that the cementum at (2¹) is much thicker than at (2¹¹). On further study we note that in the substance of the peridental membrane situated opposite the cementum (2¹), there is a very light area in its substance (4). With a higher magnification, we note that this area is filled with a fine granular derbis and many round cells. The presence of this diseased area in the peridental membrane has impaired the normal tension of the peridental membrane for the cementum. We are now in a position with the aid of this picture to

The author does not believe that the peridental membrane is the correct name for the tissue that lies between the root of the tooth and the alveolus, and further, that this tissue is the periosteum of the alveolus of the root socket, and because of the homology histologically of the cementum to the alveolus some of the fibers of the periosteum pass across and unite with the root of the tooth, and thus serve as a ligament to hold it in its correct position. To prevent confusion in the mind of the reader, the author will use the terms "peridental membrane" and "cementum".

substantiate the premise, namely, that the peridental membrane is a limiting membrane between the tooth and the alveolar wall, and is the medium of attachment between the tooth and the surrounding gingival tissues. Also, that the cementum is not developed from the peridental membrane, and that the cementoblast is not a cell which is developed from the peri-

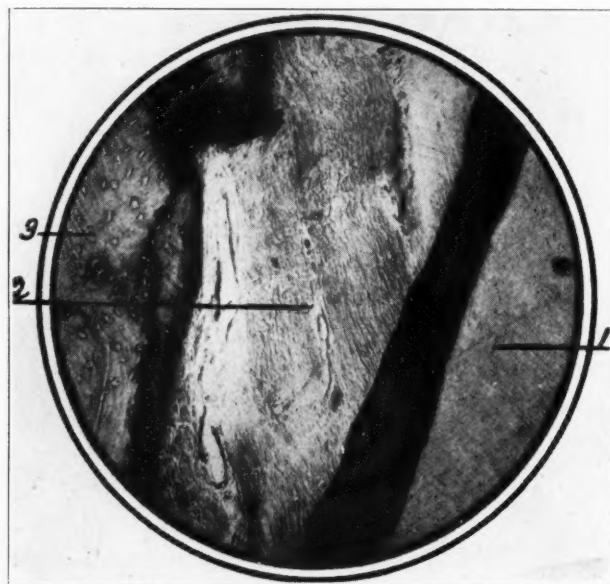


Fig. 6.

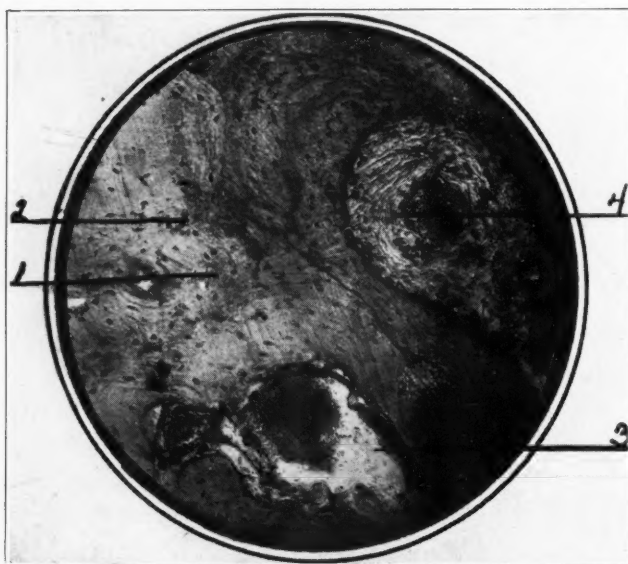


Fig. 7.

dental membrane, but comes from the lacuna of the cementum. The repair of the cementum is the result of activity of the cementoblast, which arises from the basal layer.

Immediately to the cemental side of (4), the light area in the peridental membrane, we find a thickening of the cementum. If the cementoblast

came from the peridental membrane there would be a lack of development of the cementum, as in such areas we find the peridental membrane diseased instead of a thickening as occurs near (4) in Fig. 4.

In Fig. 5 we have a longitudinal section of the root of the tooth. Beginning at (1), which is the dentin, and advancing to the left in the picture, we observe a dark broad line, which is the cementum; and continuing laterally we observe fibers of the peridental membrane sweeping across from the alveolus, and uniting with the neck of the tooth (2 and 2¹). One of the bundles of the peridental membrane (2¹) is fan-shaped, some of the fibers passing upwards, while others pass downward in their course toward the root of the tooth. The fibers (2¹) pass downward and then just before uniting with the root of the tooth they are bent slightly on themselves, and unite with the root of the tooth. The light area observed in this picture is occupied by round cells.

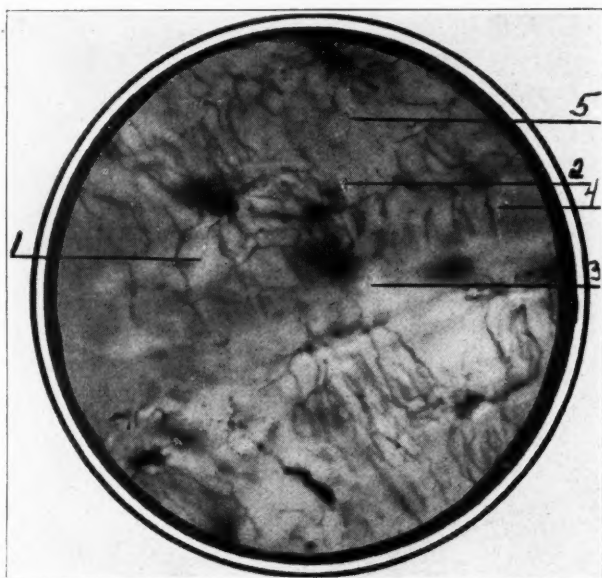


Fig. 8.

In Fig. 6, we note the fibers of the peridental membrane passing into the root socket proper, and that they are entering at an angle. This angle of the fibers is maintained practically to the end of the root. (1) is the dentin. The dense black line noted between (1) and (2) is cementum. (2) is the peridental membrane, and (3) is the alveolus. A careful study of this picture, the author believes, shows that the fibers of the peridental membrane are more securely attached to the alveolus than to the root of the tooth, and the fibers pass from the alveolus to the root of the tooth, and not from the root of the tooth to the alveolus. The nature of the membrane, as shown in Fig. 6, is such as to suggest the structure of a ligament, and it is the author's belief that the peridental membrane has no more to do with the development of the cementum than the tendon of a ligament has to do with the development of the bone.

Having thus considered the peridental membrane, let us now study some of the pictures of the alveolus. The first picture (Fig. 7) is a low power

photomicrograph. On close observation, we note that in the entire field there is one haversian canal (1), and that scattered throughout the field, without any definite arrangement in the main substance of the alveolus, are many lacunæ (2). At (3) there is a small clump of red blood corpuscles, and at (4) another clump of red blood corpuscles may be seen. The striking feature of this illustration is that, if a picture of the same area of bone which is laid down in cartilage is examined, it shows a far greater number of haversian canals than does the alveolus. The alveolus is what is termed cancellous bone, and contains a large number of medullary spaces and few haversian systems that are complete, but we often see the remains of an haversian system, part of which has been absorbed.

In Fig. 8 we have a quite high magnification of the alveolus (780 diameters). On careful examination of this picture, one notes that the canaliculi (1, 2, 3, 4, and 5), all communicate with each other. We must orient

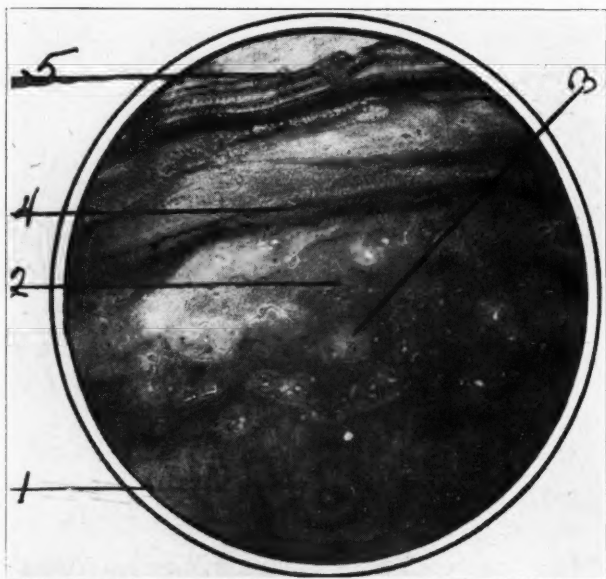


Fig. 9.

this histological observation for the reason that we will, in another part of this paper, show the lacunæ and canaliculi of the cementum. The similarity between the lacunæ and canaliculi forces us to consider that cementum and bone are tissues which are very closely related.

Fig. 9 is a cross-section of the root of a tooth showing a hyperplasia of the cementum. Beginning at (1), which is the dentin, and passing upward, that is, toward the alveolus, we observe that the granular layer of Tomes is absent, or at least poorly shown, and that in its stead are large cells (3). Howship's lacunæ are observed. In true bone when it is undergoing a process of destruction, their presence represents the stage which is associated with the osteoclast. Again we are confronted with a process which is the same as observed in bone. (2) is the cementum which is not affected but in all likelihood it would at some future time have been invaded by Howship's lacunæ had the person lived when this specimen was obtained. The lamella

(4) are very compact when compared to the lamella above, which are homogenous in structure, and contain in their substance lacunæ, but no Howship's lacunæ. Above this lamella of the cementum, we observe another lamella (5). The lower lamella is very compact while the upper one exter-

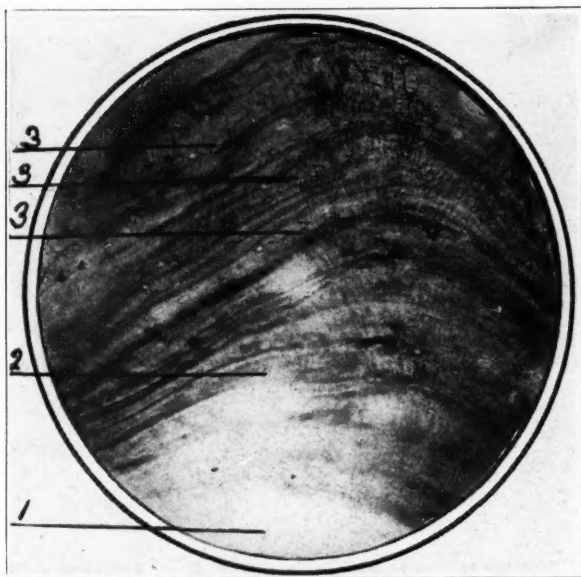


Fig. 10.

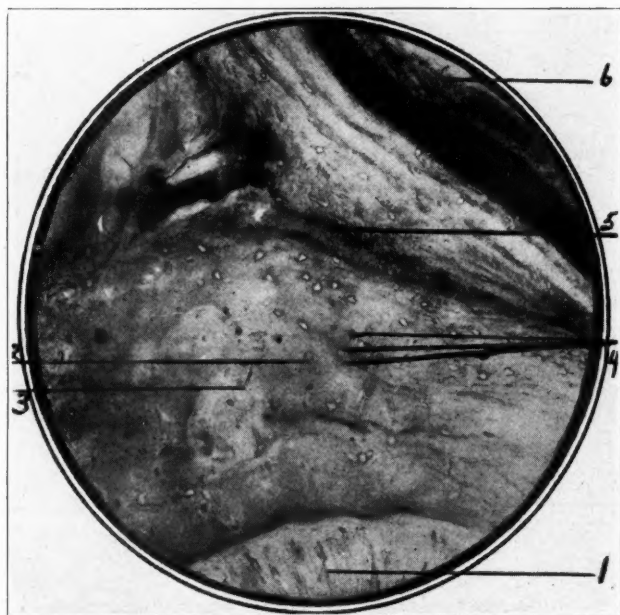


Fig. 11.

nal to it, although compact, shows fine perpendicular lines which we believe are calcified areas around the fibers of the peridental membrane.

In Fig. 10 the cementum occupies the entire field. Commencing at the lower portion of the picture at (1), we note that the lamella of the cementum

are narrower (2) than they are as we pass farther upward. Scattered without any definite arrangement in the outer lamella of the cementum we note (3, 3, 3) lacunæ, some of which stand out in bold contrast to the cementum, while others are not so sharply outlined. This, however, is not because they are absent, but is due to the fact that in focusing the microscope

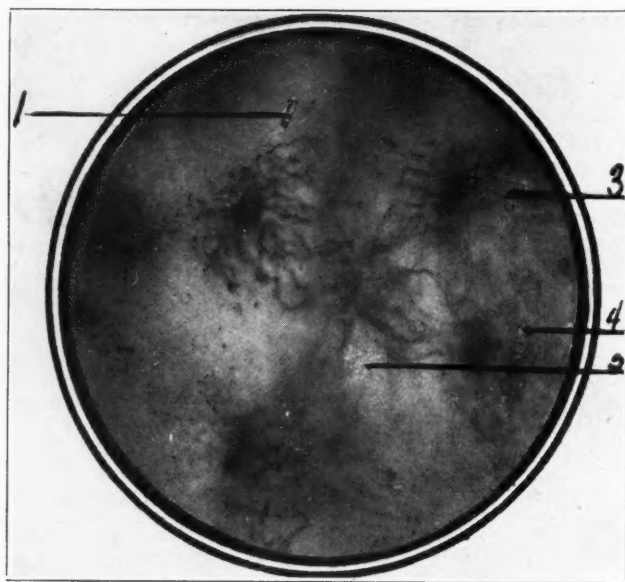


Fig. 12.

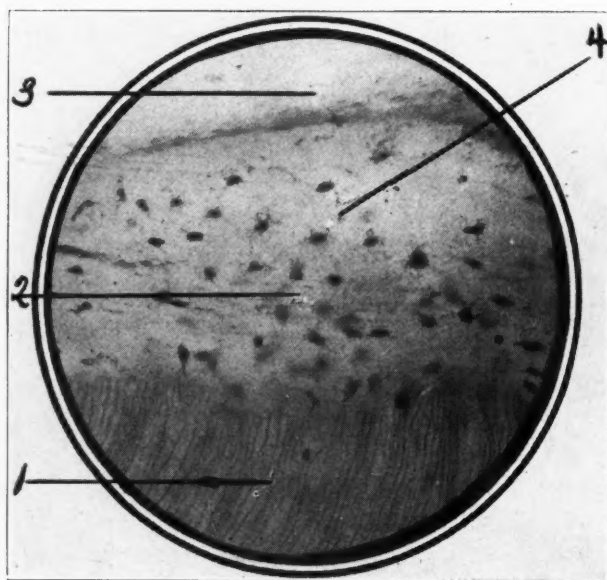


Fig. 13.

many of them are lost because they are out of focus. The cementum shown in this field, though markedly increased in amount, the author believes represents completely calcified cementum.

In Fig. 11, commencing at (1) which is the dentin of the root of the tooth, and advancing upward in the picture, we find an area which is free from

Howship's lacunæ (2, 3). The lacunæ of the cementum are shown at (4). Here as in Fig. 9 we observe that the granular layer of Tomes is absent and that in its stead we find Howship's lacunæ, and to explain their presence would be a repetition of the former description.

Having thus described the hyperplasia of the cementum, let us now

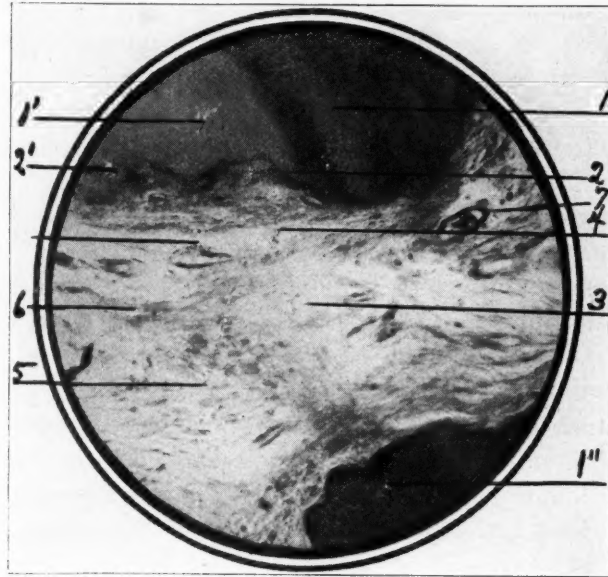


Fig. 14.

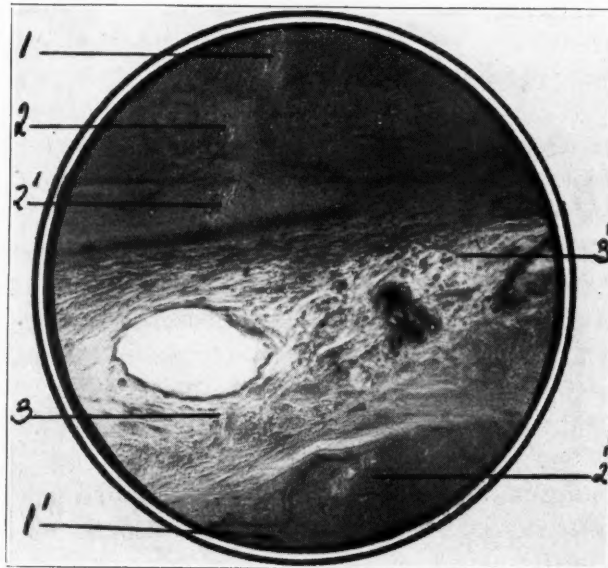


Fig. 15.

examine a high-power photomicrograph of the lacunæ and the canaliculi of the cementum. The canaliculi of the lacunæ (1, 2, 3, and 4 of Fig. 12) all show a communication with each other. This evidence, the author believes, is sufficient to substantiate the question of the regeneration of the cementum from these cells, and not from the cells contained in the meshes of the peri-

dental membrane. MacEwen, in his work, states that if the bone cells are of the same size as the cells which have been destroyed, that they become osteoblasts and thus rebuild the lost bone. The more one studies the slides on the question of the formation of the cementum the less one sees to suggest that the cementum has its origin in the fibers of the peridental membrane. One has but to compare the lacunæ of the bone with the lacunæ of the cementum to see the similarity between the two. Also there are no cells found within the substance of the peridental membrane resembling the lacunæ of the cementum which we believe are the real cementum builders.

By comparing the canaliculi of the cementum with those of the alveolus, the author conscientiously believes that an expert could not differentiate them. Thus, again we are confronted with the fact that cementum at a high magnification has all the earmarks of true bone, except the haversian system, which may be demonstrated later.

Fig. 13 is taken from one of the fragments of the fractured root near its apex. Examination of this picture shows the dentin of the fragment of the root at (1). As we advance from this area, we observe the cementum at (2). In the substance of the cementum, we note many lacunæ, and on careful examination of the picture, faint outlines of some canaliculi are discernible. We do not observe any of Howship's lacunæ, nor do we see the granular layer of Tomes, or the interglobular spaces, but we do see that the cementum is in direct contact with the dentin of this portion of the root of the tooth. (3) is the very faint outline of the peridental membrane.

Fig. 14 is taken from a field which shows the break in the continuity of the cementum as the result of a fracture near its apex. (1) and (1¹) are the outer lamella of the cementum, (1¹) is the lower lamella of the cementum, (2) and (2¹) is the newly formed cementum from the basal layer of (1¹), (3) is fibrous tissue, (4) round cells, (5) a few fibroblasts, (6) arterioles, and (7) blood vessel. If cementoblasts were present in the peridental membrane, the author sees no reason why they should not be shown at this point, as there is evidence of the formation of cementum on the fractured fragments.

In Fig. 15 the fracture of the root is very well shown. (1) and (1¹) is the dentin. (2, 2¹ and 2¹¹) is the newly developed cementum on the broken surface of the dentin. (3¹) Shows round cells, while (3) shows normal fibers of the peridental membrane. In this picture we do not see present in the peridental membrane any cells which morphologically resemble the cementoblasts with the higher power observation. In neither Fig. 14 nor Fig. 15 do we observe the granular layer of Tomes, and likewise Howship's lacunæ are absent.

From the conditions presented by Figs. 13, 14 and 15, we are confronted with the evidence that the cementoblasts are not deposited by the peridental membrane, but that they are regenerated from pre-existing cells of the same type, and that the process of the regeneration of the cementum is the same as noted in bone. That is, if the cells are of the same size as the cells destroyed, they can become active proliferating cells, and that the regeneration of the cementum is dependent on the presence of this type of cell for its regeneration.

Therefore, in the treatment of such conditions as involve the gingival border of the tooth, more care should be given to the conservation of the cementum than has been given in the past.

THE HISTORY OF ORTHODONTIA.

(Continued from page 58)

BY BERNHARD WOLF WEINBERGER, D.D.S.
NEW YORK CITY.

PIERRE FAUCHARD, born in Paris in 1690, was the first to write a treatise on purely dental subjects, with the idea of putting all he knew about odontology in a manner that would be of the greatest help and interest to those who succeeded him. In 1728, he published "*Le Chirurgon Dentist*" in two volumes, which served its purpose so well that it remained an authoritative work for over half a century. The second edition of Fauchard's work (1746) contains (pp. 275-277) the first definite account of pyorrhea alveolaris. He describes the microscopic structure of enamel and devotes a good deal of attention to the health of the teeth and their preservation. A long chapter is devoted to opiates, powders, and various mouth-washes, but the prescriptions, according to our present idea, would hardly be accepted. His treatise marks a distinct epoch in the progress of dentistry, and may truly be regarded as the first of the publications in France during the eighteenth century. He was the father of dental science in that he first advocated special education in dentistry, and did what he could to advance this by publishing his methods and experiences for the benefit of others.

In the first chapter of his work, Fauchard speaks of the structures, position, and connection of the teeth; of their origin and of their growth. He distinguishes in each tooth a body, a root, and a neck. "Although in the adult the number of the teeth is normally thirty-two, it may be that some persons have, nevertheless, thirty-one, thirty, twenty-nine, or even only twenty-eight teeth, and this independently of any eventual loss, but for the simple reason that the wisdom teeth are often cut very late in life (even after fifty years of age) or do not all come forth, or sometimes are never cut at all." The author refers to some cases of a supernumerary tooth situated in general between the two superior central incisors and similar in form to the lateral incisors. Fauchard declared the popular opinion expressed also by some ancient authors, of the milk teeth having no roots, to be false. "The roots of these teeth," he says, "are gradually worn away before the latter are shed, when the permanent teeth are just on the point of coming through, however, if it so happens that one or more of the milk teeth he extracted before the period in which they are usually shed, their roots are found to be long and as strong in proportion to the body as those of the permanent teeth. In children one finds, besides the twenty deciduous teeth, the germs of thirty-two permanent ones, for which reason it may be said that children have all thirty-two teeth without counting the germs that may sometimes be found at the extremities of the roots of the large molars. As, however, the existence of such germs is an exceptional fact the twelve large molars, if extracted, are not ordinarily regenerated."

Many before him wrote concerning irregularities of the teeth and their treatment, but as far as records show, there are few appliances mentioned. The form of the first appliance or by whom used is not known. There is

no doubt but that it dates further back than the seventeenth century, owing to the secrecy in which the dentists of the time held their knowledge, and as Fauchard mentions that the appliances did not originate with him, probably more regulating appliances were invented than we have knowledge of. However, the first important appliance that marks a distinct step in our specialty was described and given us by Fauchard in 1746. Its chief function was to expand the arch, its form assuming that of an ideal arch, and has been known as a band, bow, bandellette, and short and long band, but in



Fig. 1.—Pierre Fauchard (1690-17....). Father of dental science.

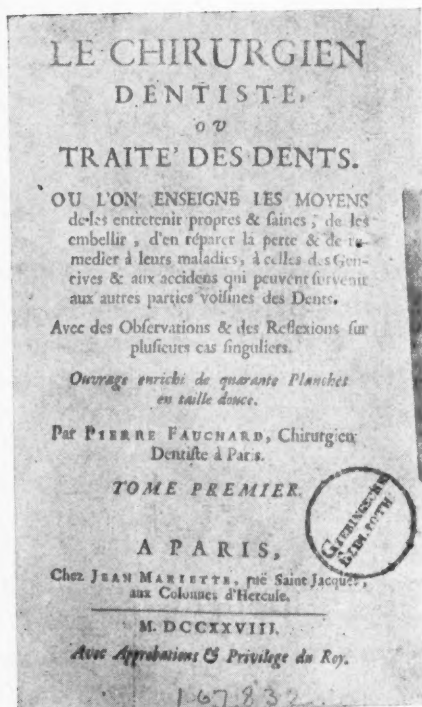


Fig. 2.—Title page. Pierre Fauchard (1728).

reality it is nothing more than what we now know as the expansion arch, with later modifications by Bourdet (1757), Fox (1803), Delabarre (1819), Schange (1841), Harris (1850), Farrar (1888) and Angle (1889). Without doubt its introduction marks the most important step in the history of regulating appliances, and although many of the appliances seem crude, bulky, and so inconvenient that they were seldom adopted, nevertheless the mechanical principles of the arch is the same today as in 1728.

To take up in detail Fauchard's work, would require more space than I can devote, however, his chapter on irregularities is so interesting that I

feel it is not more than proper to dwell on certain parts of same. He relates twelve cases of dental irregularities corrected by him with satisfaction and at times surprising results, also mentioning the similar methods of preceding dentists for moving teeth, such as finger pressure, common or silk threads (waxed), bands of gold and silver and other suitable material, and the pelican or straight forceps.

In reference to the bands, or now so-called expansion arch, he says: "If the teeth are much out of line and cannot be corrected by means of threads (gold), it is necessary to use a band of silver or gold. The width of the band should be less than the height of the teeth to which it is applied. The band

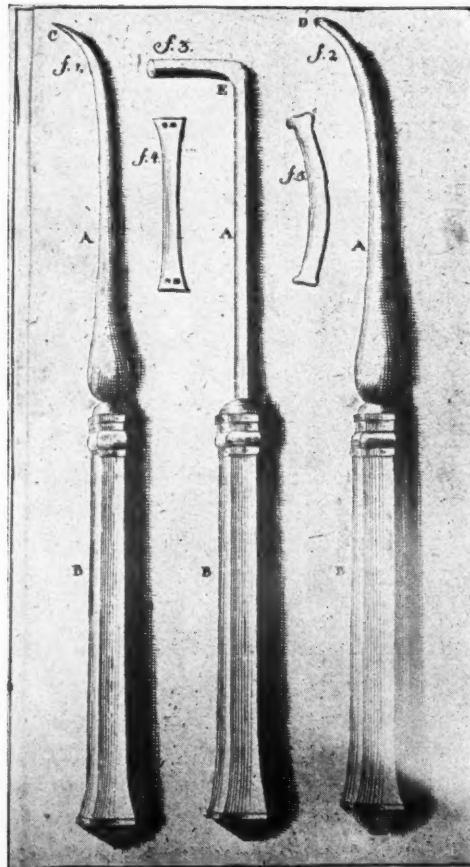


Fig. 3.—(4, 5) Silver appliance used by Fauchard to correct irregularities of the teeth. As far as known, the first important appliance used for this purpose. (1, 2, 3) Three instruments for filling teeth.

must be neither too stiff nor too flexible. Two holes are made at each end, a thread, which passing partially through forms a loop in the middle of each thread. If the tooth is inclined outward the band is applied exteriorly; if it is bent inward it is applied inside the teeth. The nearest of the upright teeth to those that are bent are then encircled with the ends of the threads, which, passed from the exterior to the interior of the arch, or from the interior to the exterior, as the case might be, finally having crossed a number of times, are tied and their end cut off."

When one end is fastened the other is treated in like manner. By the pressure and support given the band the inclined tooth will be made upright

in a short time. Fauchard, it seems, was not the only dentist of his time who attempted correcting irregularities, but with his invention he no doubt obtained more rapid and satisfactory results.

The teeth of young people, he says, are easier to straighten than older children, as the roots are not as large, and partially because the surrounding parts are softer. When persons of some years undertake this operation, considerable time is required before success can be obtained. On account of this slowness, Fauchard attempted quicker and less difficult means, namely, the use of the pelican; in this manner he could accomplish in a few hours what formerly required months with the band or wax threads.

"In Chapter XVIII the author relates twelve cases of dental irregularities corrected by him with satisfactory and at times even surprising results. We here refer, in Fauchard's own words, to the last two of these cases, not because of their being the most important, but from them it is evident that Fauchard was not the only dentist who undertook such corrections, although he was perhaps the only one who, in certain cases, carried them out with a rapid method.

"In the year 1719, M l'abbe Morin, about twenty-two years of age, whose countenance was greatly deformed from the bad arrangement of the incisors and canines, consulted various colleagues of mine as to the possibility of correcting the irregularity of his teeth. Some found the thing so difficult that they advised him to do nothing at all, that is, not to risk any attempt. He came to me by chance one day whilst another dentist was with me. We both examined his mouth with much attention. Now, as this dentist was my elder, and I believed him to have more experience than I had, I begged him to give me his opinion as to the best method to follow in this case, in order to insure success. Whether it be that he would not give me advice, or that he was not in a position to be able to do so, the fact is that his answer was not such as I could have wished. I, therefore, felt myself obliged to tell him that I hoped to put this gentleman's teeth in order within three or four days. My colleague was not aware that this could be done so quickly; urged by curiosity, he returned when the time I had indicated had elapsed and found, not without surprise, M. Morin's teeth reduced to perfect order!"

"Several years ago the wife of M. Gosset, *Reviser des Comptes*, sent for me to examine the teeth of her daughter, then twelve years of age. I found the lateral incisor on the left side of the lower jaw strongly inclined toward the palate in such a manner as to constitute a real disfigurement. Interrogated by the mother as to the possibility of remedying this, I replied that it could easily be done in eight or ten days, with the method of threads, if the young girl were only sent every day to my house. As, however, the young lady received instructions from several masters who came to her house each day, my proposal was not accepted, in order not to distract her from her studies. This induced me to say to the mother that, if she were willing, I would put the crooked tooth into its natural position in a few minutes. Surprised at so short a time being demanded for the operation, she consented to my performing it immediately. Making use of the file, I began by separating the tooth from the neighboring ones which pressed upon it, slightly diminishing the space it ought to have occupied. This done, I straightened the tooth with the pelican, placing it in its natural position, to

the great astonishment of the girl's mother and of other persons present, who told me they had many times seen similar corrections that had been carried out by the late M. Carmeline and others, never, however, with this method or in so short a time. As soon as I had reduced the tooth to its normal position I fixed it to those next to it by means of a common thread, which I left there eight days; and during that time I made the young girl rinse her mouth four or five times a day with an astringent mouth wash. After the tooth had become firm, it would not have been suspected that it had ever been out of its normal position." "When a tooth irregularly placed in the mouth cannot be straightened by any of those means," to which he alluded, "and occasions damage or inconvenience or constitutes a deformity,

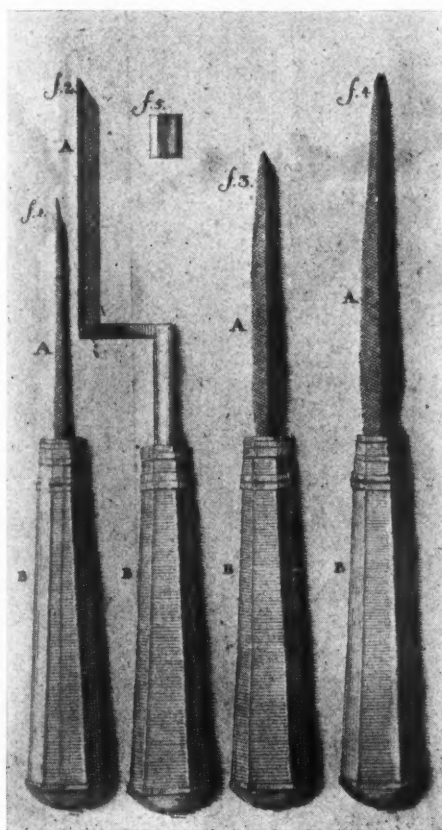


Fig. 4.—Dental files used by Fauchard. (5) Small wedge inserted between teeth in order to prevent the tooth from moving.

the sole remedy is its removal." He seldom had recourse to extraction and urges the necessity of attention to the temporary teeth. In speaking of extraction of the teeth, Fauchard begins by saying that the milk teeth, although destined to be shed, should never be extracted, except in cases of absolute necessity, as, for instance, when decayed, they give rise to intolerable pain. "The alveoli of the infantile jaw are weak, whilst the roots of the deciduous teeth are sometimes firmer and more solid than one would believe, and hence it is that in extracting a milk tooth one runs the risk of injuring the alveolus and even of carrying away a portion of it altogether with the tooth, not to speak of the danger of damaging or even destroying the germ

of the permanent tooth lying below." "Besides", Fauchard adds, "there are sometimes deciduous teeth that are never shed and never renewed. One must therefore, defer drawing children's teeth as long as possible unless they are loose. When, however, intolerance of pain or a caries endangering the integrity of the neighboring teeth oblige one to rescue without delay to extraction, one should carry out the operation with prudence and judgment, so as to avoid the dangers alluded to." "It sometimes happens", says Fauchard, "that one finds in children a crooked tooth by the side of a straight one; in these cases ignorant tooth drawers have often been known to remove the crooked (permanent) tooth, and to leave the straight, viz., the deciduous one, which afterward falls of itself, the individual thus remaining deprived of one of his teeth for the rest of his life. The rule to be observed in order

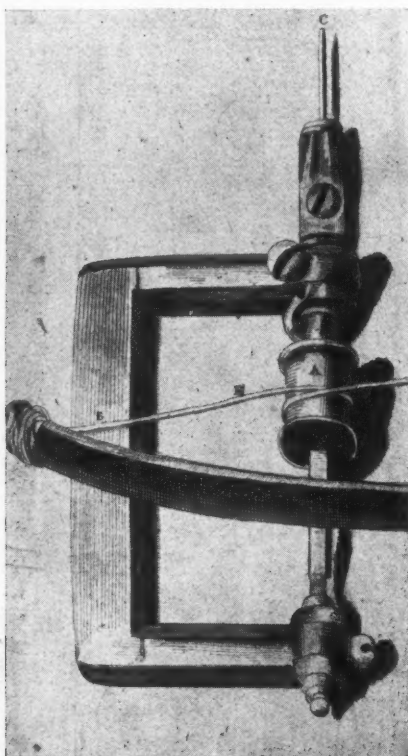


Fig. 5.—Early dental drill (Fauchard).

to avoid a similar error is always to extract the older of the two teeth and to leave the one that has been cut more recently, which is easily recognized by its being ordinarily firmer in the socket and of a better color than the first."

Here the author inveighs against all the charlatans of his day who dared, without being dentists, to perform dental operations, and whose number, it would seem, was ever increasing, so much so that he is led to exclaim: "There will shortly be more dentists than persons affected with dental diseases!" In proof of this he relates the case of a cutler of Paris, who extracted the molar tooth of a young girl because black spots having appeared on it, he believed it to be decayed; but perceiving that he had only removed the crown (it was a deciduous tooth about to fall out), and thinking that he had broken the tooth, proceeded to extract the root, removing, in his gross ignorance, the permanent tooth on the point of coming through.

"When a tooth planted irregularly in the mouth cannot be straightened by any of those means to which he afterward alludes, and occasions damage or inconvenience or constitutes a deformity, the sole remedy is its removal."

Pyorrhœa Alveolaris.¹ "There is yet another, of which I think no other author has yet had occasion to speak and which, without affecting the other parts of the body, attacks the gums, the alveoli and the teeth. Not only are softened, livid, prolonged and swollen gums affected by it but often those which are free from this vice are not exempt from the disease; it is to be recognized by rather white and sticky pus which can be made to come out of the gums by pressing the finger firmly from above downwards upon those of the lower jaw and from below upwards on those of the upper jaw.

"This pus often comes out from between the gums and the body of the alveoli and sometimes from between the alveoli and the roots of the teeth; which happens more frequently on the external surface of the jaws than upon the internal, and rather around the incisors and canines of the lower jaw, than about those of the upper, which are, however, more ordinarily afflicted with this trouble than the molar teeth."

"We can refer the cause of this disease to reapture or disunion of the capillaries produced by degeneration of the fluids which circulate through them. These fluids which have extravasated into the intermediary spaces or in the neighborhood of the same vessels which they have eroded, or burst, always tend to ferment or break down, forming little lesions more or less fistulous between the gums and the body of the alveoli, or between the alveoli and the root of the teeth. From this source is derived the purulent matter which is seen to issue from between the teeth and the borders of the gums, especially when the finger is pressed against them."

"The singular effect which I have observed is that those who have treated this disease by internal remedies whether anti-scorbutic or otherwise never succeed in curing them; which might give rise to the opinion that the disease does not come from an internal or systemic source, but from what is due to a local or accidental cause occasioned by the teeth. To assure myself of this, I have noticed that wherever teeth have been lost from this disease, the alveoli and their gums become so well reunited, cicatrised and consolidated, that no more pus comes out of them.

"I should conclude from what I have just said that this disease cannot be radically cured until the affected teeth are out of the mouth. We can, nevertheless, prevent this loss by the following means, which are to keep the teeth very clean, to lance the gums when necessary, to rub vigorously each day with the end of a finger dipped into some astringent, desiccative or anti-scorbutic wash, such as I have described on pages 91 to 92 of the present volume. It is also necessary to cleanse the mouth well after each meal with a little water and wine mixed together, and to be careful to bear down firmly with the finger upon the gums in rubbing them, in order to expel the pus, which, without this expedient, will decay them, and eat away the alveoli so that the teeth will become loosened and will finally drop out from lack of support."

I have dealt at such length upon the work of Fauchard because his

1. Fauchard, Pierre: *Le Chirurgien dentiste*, 2nd ed. Par., 1746, v. I, pp. 275-278, by F. H. Garrison, Washington, D. C.

books mark a distinct epoch in the progress of dentistry and orthodontia. He gave to dentistry the first accurate description of pyorrhea alveolaris, to orthodontia the mechanical principle of the expansion arch. Through the publication of his experiences and methods a new era began in dental science and resulted in an abundance of publications in France during the remainder of the century.

A. Geraudly, in 1737, wrote an excellent treatise on the diseases of the teeth and the method of preserving and keeping them white. He clearly demonstrates that the shedding of the deciduous teeth is brought about by the pressure exercised upon them by the germs of the permanent teeth.

M. Bunon in his work² published in 1743, reviews the work of previous authors and is the first to mention "orthopedic" in connection with dentistry.



Fig. 6.—Title page of one of the early works pertaining to dentistry (1706).

"One of the important questions studied by Bunon concerns the hygiene to be observed in order to obtain the development of a good dentition. On this question he rightly established the principle that hygiene and dental prophylaxis should begin from the period of the formation of the milk teeth. He worked on this principle with rigorous logic, and finished by tracing the hygiene of the mother during pregnancy of the woman be she mother or nurse during the nursing period and of the nursling as well."

"As to the accidents of first dentition Bunon sets forth a highly scientific opinion, fully coinciding with the ideas of modern writers, that is, that dentition is not the sole cause, nor even the principal cause, of such accidents but simply a co-operating cause. He made the observation that in healthy infants, children of healthy parents and nursed by healthy women, the time of teething is gotten over without difficulty while serious accidents occur

2. Bunon, M.: *Essai sur les Maladies des dents particulieres de l' auteur de l' Orthopedie.* Paris, 1743.

frequently in weak and sickly children brought up and nourished according to unhygienic principles, or born, as not often happens, with special hereditary predispositions."

"One of Bunon's merits is that of having attributed to the first teeth all the importance they have, and of having insisted on the necessity of attentively curing their maladies. He also drew attention to the dangers that may result from the eventual persistence of the first teeth at the epoch of second dentition, or from the persistence of their roots after the destruction of the crown by caries. These roots, he says, by their contact with the neighboring permanent teeth may infect them and cause them to decay."

Bunon's researches in the development of the teeth enabled him to describe precisely the position that the various teeth of the second dentition occupy in the jaw with regard to the milk teeth before these are shed.

Bunon speaks at length of erosion of the teeth, and declares himself to be the discoverer of this disease, which destroys the enamel of the teeth before their eruption. The first molars, the canines, and the incisors are much more frequently damaged and affected by it than the other teeth. According to Bunon, it is generally due to measles, smallpox, malignant fevers, or scurvy, when children are subject to these maladies during dentition, and more especially during the first dentition. He is of the opinion that erosion not only causes caries, but may be considered as being the origin of the greater part of dental affections.

This author distinguishes three principal kinds of dental tartar, the black, the pale yellow, and the brownish-yellow; he admits, however, two other kinds that are less frequent, that is, the red tartar and the green.

In 1742 *Joseph Hurlock*, surgeon, published his "*Treatise upon Dentition, or the Breeding of Teeth in Children.*" In it he describes the many ailments that infants are subjected to during the period of dentition, and enumerates many of the forms of treatment advocated by the ancients. The major part of the book, however, is devoted to the practice of lancing the gums over erupting teeth. He reports in quaint language twenty cases in which he claims to have greatly benefited by this treatment infants who were suffering from a variety of disorders, including smallpox, measles and scarlatina.

Mouton in 1746 published the first work on mechanical dentistry, in which he devotes some little space to malocclusion. His methods for the most part correspond with those of *Fauchard*, although he had recourse to gold crowns, making use of them on the front as well as the back teeth.

A. Tolver (1752), in "*A Treatise on the Teeth,*" describes how the teeth receive the nerves and vessels at the orifices of their roots and how these were frequently shown to the common people, by the ignorant among the tooth drawers, as the worms which would soon have devoured the whole tooth had they not been skilfully removed. He emphasizes the "necessity of the sound teeth for health in masticating food and mixing it with the saliva." He also points out to men the dangers of hasty feeding. All kinds of sweet meats, and sugar, he says, contribute very much to the destruction of the teeth, because their gluey juices stick to the teeth; besides, sugars are of an acid, penetrant and corrosive nature. Those who love sugar and use it

much, rarely have good teeth. He is opposed to scaling the teeth, as it lays bare the necks of the teeth.

Bartholeomo Ruspini, in 1750 says, "Some writers were formerly of the opinion, that men had thirty-two teeth, and women twenty-eight; but inspection may plainly evince the absurdity of this notion."

"All of the teeth that exceed those of thirty-two may be reckoned as supernumerary, they generally push out between the incisors or fore teeth of the upper jaw; and in such case the incisors are increased in their numbers."

On the generation of teeth, he says: "Nature, in forming these bones seems to deviate entirely from those laws that she has established in the production of all other bodies, and to choose a peculiar uncommon method in this generation."

"The greatest part of natural productions have their beginning in their roots; but a tooth, on the contrary, does not begin to form its roots till the body is perfectly finished. The first substance that begins to appear in this body is not the internal part, as one would imagine, but the external one, the farthest from the root, and what is called enamel. This substance in its beginning, is nothing but a mucus, soft paste, which acquires insensibly so much firmness, that it becomes at last a bony part, and excels all other bones (as we have shown in its proper place) in point of hardness and whiteness. When once this scale or bony coat is formed, the tooth assumes directly a proper figure, and its inward part begins to be filled."

"It is sometimes necessary to draw those teeth that lie across, or ride upon one another (a very disagreeable sight), in order to give a more exact and uniform arrangement to the rest. This defect of order in the canine and incisors in general, proceeds from an extreme narrowness of the jaws. But the operator must be very circumspect in examining every circumstance relative to the tooth; and socket, before he draws a milk-tooth; and if a part of the socket should be broken and give way, the second tooth will always come out in an irregular manner."

"*Philip Pfaff*, dentist to Frederick the Great, King of Prussia, was the first among the Germans who wrote a real treatise on dentistry. His book contains, the anatomical and physiological notions relative to the teeth, as well as all that belongs to dental pathology, therapy, and prosthesis. Gingival abscesses as well as fistulæ of the maxillary region almost always owe their origin, says Pfaff, to decayed teeth; and can, therefore, in general, not be cured except by the extraction of these teeth."

The prosthetic methods described by this author are, for the most part, identical with those of Fauchard and the other French dentists already mentioned. As to the materials used for prosthesis at different periods, Pfaff mentions, besides ivory, bone, hippopotamus tusk, teeth of sea cow, and human teeth, also teeth made of silver, or mother of pearl, and even of copper enamelled.

The chief merit one must concede to Philip Pfaff is that of having been the first to make use of plaster models. The casts of an entire jaw were taken by Pfaff in two pieces, one of the right half of the jaw, and the other of the left; which were then reunited, and one thus avoided spoiling the cast in removing it from the mouth.

Another great merit of Philip Pfaff is that of having first carried out the capping of an exposed dental pulp, previous to stopping a tooth.

Bourdet, dentist to the king, an eminent writer on dental art, published in 1757 the best work since *Fauchard*. In it he condemned as harmful the use of such things as bone rings and other hard substances people are in the habit of putting in the mouths of children. He carried the use of metal strips a step further than *Fauchard*.

"When the canines and incisors of the lower jaw protrude against the lip, the deformity may be corrected by the use of strips of plate. To put the upper teeth in their proper anterior position, and to draw back the lower ones, two semi-circular strips must be made, which surround the teeth from the second molar on one side to the same tooth on the other side. Each strip should be pierced with twenty small holes, which, when the device is

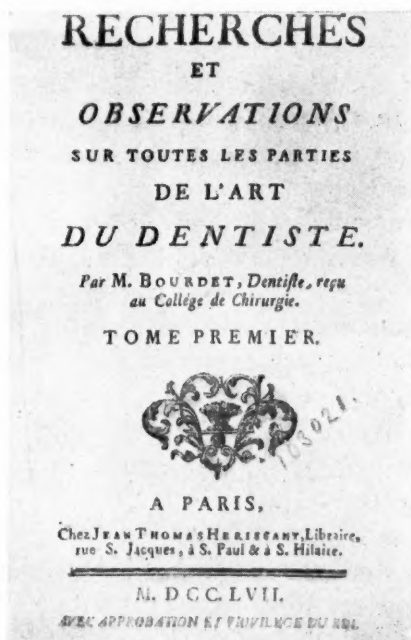


Fig. 7.—Title page, Bourdet (1757)

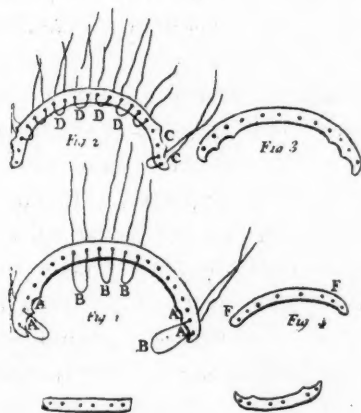


Fig. 8.—Bourdet's appliances (1757).

applied, ought to be exactly opposite the teeth which are to be placed in order, so that the thread caught in the two holes which serve for each tooth may draw it toward the strip. The strip of plate for the upper jaw will, of course, be larger than that for the lower, and it will be placed outside, toward the lip; while that for the lower jaw will be placed inside the dental arch toward the tongue. As to the lower strip, each thread will form a loop on the strip's posterior face, and the ends which pass between all the teeth will fall outside and be tied each on its own tooth!"

Following this, Bourdet gives a minute detailed description of the tying of each thread, which is unnecessary to quote here. He then continues as follows:

"Nearly the same process is followed with the strip of plate on the lower jaw. The threads are passed in and out in the same manner and then tied

and knotted on the teeth. These strings should be removed and retightened twice a week, until the teeth have resumed their proper position—that is to say, until the teeth of the upper jaw are drawn forward, so that no part of them is hidden behind those of the lower jaw. When this operation is properly performed—the improvement is so great that the patient is hardly recognizable.”

“Strips of plate ought to be of gold,—never silver, which turns black in the mouth.”

“Sometimes, when the permanent canine comes forth, it has not room enough, and therefore grows outward. In this case Bourdet extracts the first premolar; the canine then advances gradually of itself toward the space left by the extracted tooth until it occupies its place exactly. He also counsels the extraction of the first premolar on the opposite side of the jaw, in order to preserve the perfect symmetry of the dental arch on both sides. When the arch formed by the jaws is too large and of an ugly appearance, Bourdet advises extracting the first upper and lower premolars, so that the dental arches may acquire a more regular form. In cases in which the defect of form exists only in the lower jaw, that is, in children who have protruding chins, Bourdet corrects this deformity by extracting the first lower molars shortly after their eruption, that is, toward seven years of age. In this manner, says the author, the lower jaw grows smaller and the deformity disappears. The inventor of this method, as Bourdet himself tells us, was the dentist Capuron.”

“Bourdet made prosthetic pieces, whose base, representing the gums and the alveoli, was made entirely of gold and covered over with flesh-colored enamel on the outside, so as to simulate the natural appearance of the gums; the teeth were adjusted into the artificial alveoli and fixed with small pins. At other times he made use of a single piece of hippopotamus tusk, in which he carved not only the base, but also the three back teeth on each side, whilst the ten front teeth were human teeth fixed to the base with rivets.”

“One of Bourdet’s principal merits is that of having brought artificial plates to perfection by fixing them not, as heretofore, to the opening of the palate or inside the nose, but by means of lateral clasps fitted to the teeth.

“In a special pamphlet, published in 1764, Bourdet treats of the diseases of Highmore’s antrum. To facilitate the exit of pathological tumors from the sinus, after the Cowper operation, he introduced a small cannula, forked at one end, into the antrum, and fixed the two branches of the fork to the neighboring teeth by tying.”

Jourdain was another eminent writer on dental matters, at this time. In 1759, Jourdain described in the *Journal de Medecine* an improved pelican and another instrument to be used for straightening teeth inclined inward. Two years later he published his treatise on the diseases of the antrum of Highmore, and on fractures and caries of the maxillary bone. After this, appeared his book on the formation of the teeth. He therein described with great accuracy the dental follicle from its first appearance to the moment of birth, following it throughout its evolution.

A. A. Brunner (1771). One of the most distinguished German dentists in the second half of the eighteenth century was Adam A. Brunner. “A milk tooth,” says Brunner, “ought never to be extracted unless there be

manifested signs of the presence of the corresponding permanent tooth, or when it is painful or decayed. Badly grown teeth can often be put in order solely by the pressure of the fingers frequently repeated, but when this is not sufficient one must have recourse to waxed threads or to special contrivances."

Thos. Berdmore, dentist to George III, the first to receive an appointment as dentist to a royal family, was one of the earliest and foremost dentists in England. His work, "*A Treatise on the Disorders and Deformities of the Teeth*" published in 1786, marks the appearance of the first important English publication.

"Berdmore contributed to the progress of dentistry in England not only by his writings but also by imparting theoretical and practical instruction



Fig. 9.—Bourdet's forceps for extraction of teeth.



Fig. 10.—Adam Anton Brünner (1771).

to many medical students desirous of practicing dental art as a specialty. One of these was Robert Wooffendale, who came to America in the year of 1766, and was the first dentist whose name is recorded here."

"In his work he thus describes what he thought to be his mechanism, but which was really Fauchard's."

Irregularities of the Teeth, and the Reduction of them by Ligature.—Irregularities of the teeth are extremely frequent, where none of the above mentioned precautions have been taken, and where the second as well as the first dentition has been neglected as a matter of no concern; it is often required therefore, to correct by art, what at first might easily have been prevented.

To bring the teeth which are ill set into beautiful order, at any time of life, is promised every day in the public papers, with the greatest assurance, by several people who profess themselves dentists; and I am afraid that there are enough people to believe such advertisements, and to accuse every man of ignorance, who should affirm that it is impossible. Yet, notwithstanding all this, I will freely own that I never have, nor even will attempt this ingenious practice upon grown people; for reasons which I shall assign, after having first shown the different methods of it.

The first is to pass a gold wire or silken ligature from the neighboring teeth or either side, in such a manner as to press upon that which stands out of the line, in a direction which shall tend to reduce it.

The second is to fix a thin, elastic gold plate, of the breadth of a watch-spring, on that side of the tooth which recedes most from the proper line, and then to fasten the ends of it to the teeth on either side, so that the bent of the spring may tend to press the irregular tooth back to its place. This, and the former contrivance, may be applied where one or more teeth incline inwards, as well as when they project externally.

The next method is not quite so gentle, and consists in breaking the teeth into order, by means of a strong pair of crooked pliers, after which the ligature is to be applied. The last is, to file them into order.

In advanced age, it is well known that the teeth are so deeply and firmly fixed in the substance of the jaw-bone, that it requires a considerable power to force them out of their places, and that none of the bones, at this period, will yield to slight, continued pressure, in the same manner as the tender, growing bones of children will do. But without a yielding of the bony sides of the sockets, or of the flinty substance of the teeth, how is it possible to bring a tooth which projects outward, or inclines to the inside into the proper line; or supposing this were feasible, if the pliant bones of children requires a considerable length of time to effect such alterations, what would be the time necessary on this occasion? If we may tell the truth, such notions belong to fancy not to practice; and such promises are founded on ignorance, or intended for deceit.

The same observations apply to the second method, or to those that pretend to have used the elastic plate successfully.

As to the third, it is such a treatment as need not be opposed; because it is not credible that any grown person is so easily persuaded, and so regardless of pain, as to submit to the trial. But supposing the case were otherwise, it is well known that a tooth in a grown person cannot admit of any considerable change of situation, without being raised out of the socket; so that whilst the operator brings it into the line on one hand, he raises it above the level on the other; he destroys its connections, exposes it to looseness, pain and decay, and makes it incapable of bearing the ordinary impression in chewing; an evil much greater than the total loss of a tooth.

As to filing the teeth into proper shape, size and order I know that it is practiced every day, and shall therefore consider it more at large, after I have first pointed out some instance where the reduction of the teeth is practicable and safe, and which serve as a pretext for the exaggerated accounts, and the incredible pretensions of those who promise to succeed at all times.

Between the seventh and twelfth year, whilst the teeth are growing, and the sockets are in a condition to yield, by degrees, to any constant pressure, if the edge of a tooth stands out of its proper direction, it may oftentimes be brought back, provided likewise that the projection of the tooth out of its required direction be not very considerable, and that the pressure do not fall solely on the two neighboring teeth; for it always should be divided by throwing a few turns of the wire or ligature over some of those that stand at a distance. The use of the elastic plate is more inconvenient to the patient, but not more effectual than this method; and the application of instruments, to force the teeth at once into order, is extremely dangerous at any age; since it is more likely to loosen them, and make them fall out, than to give regularity and beauty.

Of the Use and Abuse of Filing to Remove Irregularities of the Teeth.—There are many instances in which it is advisable and safe, as well as ornamental, to file the teeth; but as it is usually practised, nothing can be more prencious.

Since it cannot be supposed that any man is so lost to shame and humanity, as to expose his patient to pain and inconvenience during life, merely for the sake of a trifling fee, the

indiscriminate filing of teeth, so common at present, should be imputed only to ignorance, and may, I hope, be checked, by placing the subject in a clear light, and by drawing the line to distinguish where it may, and where it may not be practiced with safety.

1. In people far advanced in years, the teeth may be filed into order without any inconvenience; because the nerves are lost, the teeth can feel no pain in the operation, nor afterwards from cold, acids, or sweets, and because they are not then so much subject to caries or decay.

2. Where a tooth projects beyond the common level, and hinders the rest from meeting equally, or receives, on itself alone, all the pressure which should fall divided on a whole set, there, filing is necessary at any age, to remove the greater evil.

3. Filing is necessary and advisable to remove sharp points, occasioned by fracture or otherwise, which irritate and wound the lips and tongue; because, in this case, the bony part of the tooth is already exposed, and cutting off the sharp prominences cannot make it more liable to caries or pain than it would otherwise have been.

4. Where a tooth points obliquely against the tongue, or against the lips, as often happens on account of the resistance of the milk-teeth, it is necessary to round the edge by filing, to prevent its wounding the soft parts.

5. When the edges of the fore teeth are uncommonly sharp and thin, and therefore apt to splinter, it is very proper to file them down, to give them a more obtuse and durable edge.

6. Filing is likewise advisable to remove caries, to prepare a tooth for the reception of a new crown, and in a few similar cases, related in the second part of this treatise.

7. When the teeth stand irregularly, and are too broad to admit of being reduced to one uniform line, filing between them, to lessen their size, may be practised to a certain degree; but great care should be taken not to cut away the enamel totally, as is too often practised on this occasion.

If a man has no feeling, nor any other use for his teeth but for the ornament of his countenance, I should not limit the use of the file to these cases only. But since most people from infancy to middle-age, feel insufferable pain the very moment the file touches the bony substance; and since this pain must be very often repeated, because each successive surface of the osseous substance must have some time to wither, and lose a part of its sensibility, before it can admit of filing beyond a certain depth; since it happens, likewise, that the enamel once removed, is never regenerated, that a tooth in this naked state is for a long time affected with pain from the slightest impression of cold, acids, sweets, etc.; that it wears away quickly, and is very much subject to decay; I cannot join to support the common practice of indiscriminate filing; I think it should be confined to the cases above related, for I believe it is advisable in these only.

Hence it is, that I so frequently refuse to perform this ornamental operation for my patients, and that I have often advised young people, who have credulously listened to advertisements and promises of this kind, never to barter a sure and valuable blessing, irregular teeth may last healthy and unpaired to the latest period of life, and the deformity in general is not very great, provided they are kept clean, white, and polished.

The cautions which are to be observed in filing, and the method of reducing the projecting teeth to one uniform edge, so that the upper and under rows may touch on at present; having through the whole, endeavored not to swell this work with descriptions which are only intelligible to operators, who ought to learn the mechanical part of this art from experience and not from books. I will not, however, conclude this chapter without observing that the people of this country, who practice on the teeth, are not quite so liberal in their promises, nor so fond of cutting and filing as the gentlemen who quit the continent for our sakes, and walk in a more exalted sphere, piquing themselves on the dignity of having served Counts and Marquises in the station of valets de chambre, and of having seen the art of filing practiced in twenty provinces.

The cause of supernumerary teeth or a double row of teeth is due to the fact that the milk-teeth are never shed, notwithstanding the fact that the permanent teeth appear. Irregularity of the teeth is due to the resistance offered the permanent by the temporary, which also occasions snagged, rough and indented teeth.

CASE HISTORY.

BY H. C. POLLOCK, D.D.S., ST. LOUIS, MO.

HISTORY.—Age 12. Classification (Class II, Div. 1). Full complement of teeth with well-developed and sharp cusps, with the exception of upper left first molar which was broken down with pulp lost.

Patient was examined three years previous to consulting orthodontist, by a rhinologist, who reported the passages free of any lymphoid tissue, subsequent to this examination on two separate occasions as to condition of the nasopharynx and each time it was reported clear. Further, marked distal occlusion does not exist in either parent or in any of his ancestors insofar as it is possible to obtain data on this point.

It is possible this case is of some interest on account of the lack of muscular function of the lips as the photographs clearly indicate, and belongs to that type of cases which some authors describe as "the action of the muscles

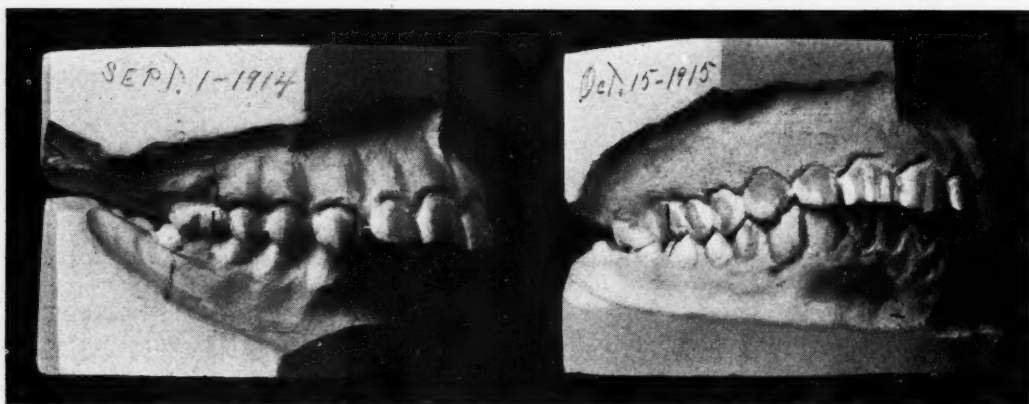


Fig. 1.

Fig. 2.

of the lips being abnormal the upper lip does not exert pressure upon the upper anterior teeth thus allowing them to protrude, the mouth is open and the lips parted, the lower lip drops back against the lower anterior teeth and the upper portion of the lower lip exerts pressure on the lingual surface of the upper anterior teeth. The constant irritation of the lip caused by contact with the upper teeth causes the lower lip to become thicker, which, acting as an elastic cushion, causes the upper teeth to protrude to a more marked degree." Another unusual point in this history is the several reports of a clear passage in the breathing space, as this type of case usually shows a history of adenoid vegetation complicated with the mouth-breathing.

The lips had never developed the muscular function; they had no muscular tone. At the time treatment was started the patient was unable to cover the teeth with the lips, partly on account of the lips not being sufficiently long to cover the abnormal space and no doubt also partly due to his inability to exert any muscular effort of the lips in closing them. The function of the orbicularis oris seemed to be practically nil,—the patient was unable to pucker the lips, even in the slightest degree as is done in an effort

to whistle. Both lips had developed to an abnormal size and shape as is indicated in Fig. 3.

Etiology.—Some writers who have made extensive researches in regard

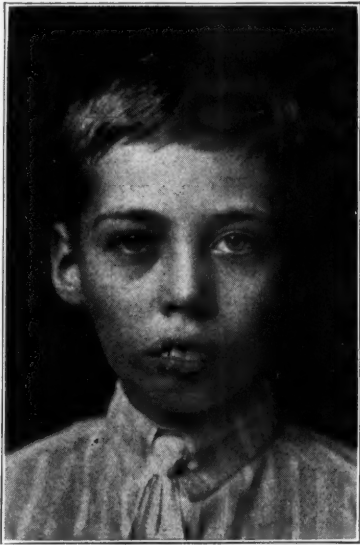


Fig. 3.—Oct. 4, 1914.



Fig. 4.—Oct. 4, 1914.

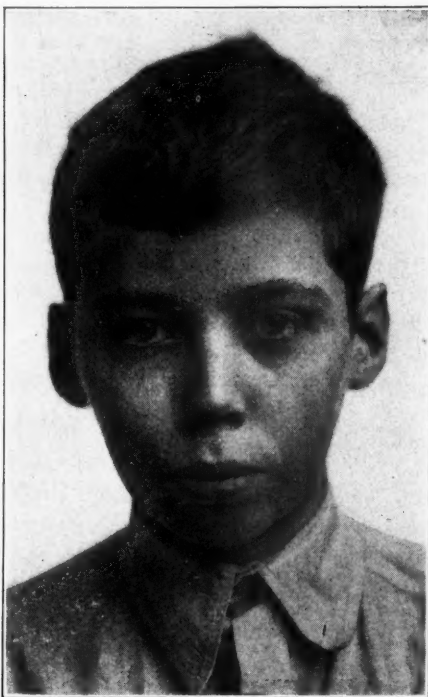


Fig. 5.—Oct. 13, 1915.



Fig. 6.—Oct. 13, 1915.

to this type of development and writing from an orthodontic standpoint maintain this entire abnormal anatomical architecture to be a result of constant mouth-breathing during the developmental period and enhanced by the

resultant distal occlusion of the teeth. Others writing from the standpoint of oral surgery contend that nature has equipped this individual with an unusually short, underdeveloped mandible, with a short ramus, much the same as she equips some individuals with a short bony structure of the nose and others with a large framework of the nose, and having made a start the teeth are unable to engage normal occlusal relations at the proper period. In any event the development is progressive, and as soon as the teeth are mechanically placed in normal occlusion this region of the face soon assumes an entirely different relation to the bony structure. To mechanically shift the occlusion of the teeth and expand the dental arches, causing the bones about the maxillary region to assume greater size and different relations to each other, certainly gives results in these cases which are gratifying; but not all that is to be desired. The teeth must be allowed to fix themselves in their new position of normal occlusion and the pounding of the mandible against the maxilla in the masticating of food through the medium of the teeth must be exerted for months before we may expect the best balance of the face as a result of orthodontic procedure.

Treatment.—Expansion arches of .030 tungsten wire were clamped to the first molar teeth and the usual procedure of the Baker anchorage resorted to. The retainers being used are the Angle pin tube appliance on the lower arch, as it has been observed the best balance is obtained and development of the mandible encouraged by the prolonged application of these appliances where there is required a considerable amount of bone development.

Sterilization of Dental Instruments.

THE possibility of the transmission of disease through the medium of dental instruments has probably been considered by every occupant of the dentist's chair. It constitutes one of the fears with which a patient is possessed the moment he adjusts himself for his period of treatment. Authoritative instances of the conveyance of contagion in this manner are extremely rare, its frequency not being determinable, although few will deny the possibilities of occurrences of this character.

The list of organisms which may contaminate dental instruments is formidable, but this does not mean that the diseases of which they are the causative factors necessarily ensue if they are accidentally carried into the mouth. Their presence upon dental instruments is, however, an indication of what the surgeons call poor technic. In surgery, poor technic is usually attended with disastrous results, but in dentistry errors of this character may produce no ill effects. In spite of this relative freedom from danger, dentists are determined that their methods shall equal the highest standards.

Cleanliness should be the primary consideration in all dental operations. The white coat of the operator represents more than comfort; it is the symbol of neatness. The dentist who works with unclean instruments, who provides soiled linen, or who places a common drinking glass before his patient, should be judged accordingly. Fortunately the members of the profession who do these things are criticized and suffer from loss of patronage, so that there is a strong tendency on the part of the dentists to maintain their surroundings above reproach. With the sterilization of instruments some carelessness may manifest itself, partly owing to the fact that many instruments are injured by such processes, are too complicated to be treated in this manner, or that the public is not competent to detect errors of technic. However, the public is rapidly learning the value of aseptic methods and the proper equipment is now found in nearly all dental offices.

Thorough studies of the sterilization process have recently been made for dentists by the United States Public Health Service, at the request of various dental associations throughout the country, and in a recent publication of that Service detailed information will be found as to the accepted methods for sterilization of all dental instruments.—*Boston Med. and Surg. Journal.*

CURRENT ORTHODONTIC LITERATURE

EDITED BY H. C. POLLOCK, D.D.S.

Other Points in Malocclusion.

IN AN admirable paper entitled "A Consideration of the Problems Involved in Removable Bridgework" (*Dental Review*, February, 1916), Doctor Karl G. Knoche, Chicago, takes up the question of malocclusion and maintains that with its resultant undue pressure in an abnormal direction on the peridental membrane plays the most important part in the development of pyorrhea conditions. He points out that the loss of a single tooth, the failure to properly separate teeth resulting in the loss of normal contact, and many other things brought about a malocclusion that brought about acute pyorrhea which could never be successfully treated without the restoration of the proper occlusion.

Malocclusion, he says, means any break in the continuity of the dental arches, for just so soon as we have a break we have an abnormal condition and a malocclusion. This break may be a cavity allowing the tooth adjacent to it to move forward and we then lose normal contact with the resultant pinching out of the interproximal tissues and a loss of what Dr. G. V. Black so clearly calls the alveolar crest. Unless the teeth are properly separated and a filling then inserted to restore the normal contour of the tooth involved we simply perpetuate the abnormal condition and we have ultimately a loss of interproximal tissue and so on. This break may be the loss of a single tooth allowing the teeth to tip and so producing stress in an abnormal direction on the peridental membrane and then the inevitable follows.

This abnormality may be an interference with the normal exercise necessary to maintain the health of the teeth. We find teeth under too great stress or too little. In the first place an inflammation is set up by the irritation and in the second we have a lowered vitality and lack of resistance due to improper stimulation. This break in the normality of the dental arches may be in the nature of uneven wear of teeth which must mean uneven stresses. This malocclusion may so often be the result of apparently well-made fillings and inlays. The presence of fillings of any sort which are not perfect reproductions of the occlusal surfaces are sure to produce malocclusion simply because the flat surfaced inlay provides a fine surface for the patient to slide around with no place to lock and maintain the balance. One of the greatest faults found with fillings of all kinds is the usual total lack of the marginal ridges. They are usually provided with planes inclining toward the contact point affording every opportunity for food, to pack against the gum septum.

Dr. Knoche states that his one great objection to amalgam is the fact that for some time he has believed that many men shorten the bite somewhat every time they insert an amalgam filling by excessive trimming to protect the still plastic material. The nature of the material influences the operator to trim until perfect occlusion is lost.

One of the most valuable contributions to dentistry is Dr. J. Lowe Young's work on the correct occlusal restoration. He arrives at his deductions not from an operative experience, but in his treatment of mouths as an orthodontist. He found that his own results were unsatisfactory in mouths that have had poor occlusion restoration. His work brings the lesson that by placing poorly made occlusal restorations in the pits and fissures of children's teeth, we may bring about a malocclusion that in after life results in the worst kind of pyorrhea.

As to the results obtained by a restoration of the normal occlusion in post-pyorrhea treatment, Dr. Knoche says that they are often startling, and that he has known many cases in which the instrumentation was simply palliative and of temporary benefit until the malocclusion was corrected and the teeth stimulated or rested, as the case might be. So this subject becomes one of vast import and he is convinced that general practitioners, pyorrhea and prophylaxis workers, or bridge workers, need a clear knowledge of dental anatomy and especially that portion that deals with occlusion and its abnormalities even to a greater degree than does the orthodontist, if the public is to be served in an intelligent and beneficial way.

Book Reviews.

A Text Book of Operative Dentistry.—By various authors, edited by C. N. Johnson, M.A., L.D.S., D.D.S., Professor of Operative Dentistry in the Chicago College of Dental Surgery, Editor of the *Dental Review*. Third, edition, revised and enlarged, with 805 illustrations. Published by P. Blakiston's Son & Co., Philadelphia. Cloth binding, \$6.00 net.

No book devoted to the science of dentistry has had a greater sale than Johnson's Operative Dentistry, which is now in its third edition. The book, written by various authors, deals with the field of operative dentistry in a very complete manner. Probably no better authorities could have been obtained than those who collaborated with Dr. Johnson in writing the various chapters. Of interest to men engaged in the practice of orthodontia, we might call attention to Chapters I and II, edited by Dr. C. R. Turner. The illustrations used in these chapters, some of which are original, especially of the dental anatomy, are very accurate and instructive, while a great many of those devoted to the subject of histology have been gathered from the writings of various authors, and are very beautiful. Chapter XXXIII, on the subject of orthodontia, is edited by Dr. Herbert A. Pullen, of Buffalo, New York. It would be very hard indeed to find anyone in the dental profession better suited than Dr. Pullen to write a chapter on orthodontia such as is found in Johnson's Operative Dentistry. The entire subject of orthodontia is covered in a very satisfactory manner, a large number of original illustrations are used, some of which show special apparatus, appliances and instruments, as designed by Dr. Pullen. It would be well worth while for anyone interested in the subject of orthodontia to purchase Johnson's Operative

Dentistry, if for no other reason than simply to obtain the chapter written by Dr. Pullen. We believe the third edition of the book will occupy the same prominent position in dental literature that the other editions have maintained.

Orthopedic Surgery.—By Edward H. Bradford, M. D., consulting Surgeon for the Children's Hospital, Boston, and to the Boston City Hospital, Professor of Orthopedic Surgery Emeritus in Harvard University, and Robert W. Lovett, M.D., Professor of Orthopedic Surgery at the Harvard University, Surgeon to the Children's Hospital, Boston, Surgeon-in-chief to the Massachusetts Hospital School. Fifth edition, profusely illustrated. Published by William Wood & Company, New York.

In the past few months several papers have appeared in orthodontic literature upon the general health of children as affecting the development of the teeth in childhood and such other factors as produce malocclusion. Treatment of malocclusion, dealing with the structures surrounding the teeth is, in reality, a certain part or a specialty of orthopedic surgery. Several years ago, Dr. Case coined the term "facial orthopedia," because of the similarity which existed in the treatment of the teeth and jaws to the correction of deformities of bone in other parts of the body. Bearing this in mind, those engaged in the practice of orthodontia would do well to pay more attention to the literature of orthopedic surgery. This work by Drs. Bradford and Lovett especially contains a great many points of interest to the orthodontist. Tuberculosis of the bones and joints, tuberculosis of the spine, and tubercular disease of the hip, as well as tubercular disease of the ankle and other joints, are considered in a scientific and interesting manner. The pathology of these cases, as it affects the bones, is of especial interest to those engaged in the treatment of malocclusion. The section dealing with the deformity of rickets is of so much value that any one engaged in the practice of orthodontia can ill afford to miss the reading of this chapter, dealing, as it does, with the general causes and pathology of rickets. There is no question in our minds but that a large number of malocclusions have rickets as a predisposing, if not the exciting cause. This work describes rickets in adolescence, or late rickets, as a disease which affects the person about the age of puberty, which, in our minds, is the predisposing cause of the largest number of malocclusions that we have to treat, and probably the predisposing factor to a great many of the failures which we encounter during retention. The various deformities, which are shown accompanying rickets, can not help but impress one with the fact that deformities of the mandible and the maxilla are very early produced by such a disease. The work is of especial value, of course, to orthopedic surgeons, but even to orthodontists it presents so many interesting and valuable points that we believe it would be a valuable addition to the library of any one engaged in this specialty.

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EDITORIALS

The Relation of Oral Surgery to Orthodontia.

CLOSELY related to the practice of dentistry are two specialties, oral surgery and orthodontia, both of which have more or less relation to the practice of medicine and are very closely related to each other. Orthodontia has been defined as that science which pertains to the correction of malocclusion of the teeth, while oral surgery deals with the correction of pathological conditions associated with the oral cavity, and also with the correction of certain congenital and acquired deformities. Orthodontia has also been defined as dentofacial orthopedia, and may therefore be said to be orthopedic surgery of the face and closely related to oral surgery. There is no question that the correction of malocclusion of the teeth will prevent and correct a large number of facial deformities, which, of course, are the result of acquired conditions that produce abnormal development. As has, however, been stated by Drs. Blair and Federspiel, orthodontia has its limitations, and there are cases where facial deformities that are the result of acquired conditions should be corrected by operative surgery. Overdeveloped mandibles have also been improved by plastic surgery by operating in such a manner as to produce a shortening of the mandible. Orthodontia is based on the philosophy of proper occlusion, and in orthodontic treatment we are forced to obtain improvement by a method that will produce a gradual development

of the parts and that will tend to conserve the tissue rather than to destroy it. In times past a great deal of oral surgery has been done, not so much with the idea of preserving tissue as with the object of getting certain definite results, and these results sometimes present very little improvement over the original condition. It is a well-known fact that most of the successful oral surgeons are those who have an intimate knowledge of dentistry, and it is equally true that the greatest success in oral surgery is obtained by those who have a definite knowledge of orthodontia. There are many cases in which the greatest benefit can be obtained for the individual by a combination of orthodontia and oral surgery—in other words, by a combination of orthodontia and orthopedic and operative treatment. We have seen many results of operations for cleft palates and harelip where the operations were performed solely with the idea of closing the cleft, without paying any attention to the relation of the superior maxillary to the nasal cavity. The dental arch had been entirely ignored, the sole object having been the closure of the cleft. We have seen persons of quite an advanced age with cleft palate and harelip whose condition, in our opinion, could have been greatly improved with the proper operative treatment, but they had refused to be operated on because they had learned of some baneful result that had been produced by some surgeons who operated simply with the idea of closing the cleft. If the operator has a knowledge of the proper occlusion of the teeth, the relation of the alveolar process, and the necessity of having the alveolar process establish the dental arch, there will not be so many imperfect results as in times past. With a large number of cleft palate and harelip cases the trouble is not so much the absence of structure which produces the cleft, but there has been a misplacement and an abnormal development. Very often the premaxillary bone is displaced, and, if gradually worked into position, as has been suggested by Dr. Federspiel, a much better result can be obtained by combining orthodontic treatment and oral surgery than can be obtained only by the latter method. We believe that in the future the successful oral surgeons will be the orthodontists. The technic described by Dr. Federspiel can be successfully practiced only by the man who has a knowledge of orthodontia, and who is capable of adjusting appliances in such a manner as to hold the parts in position, depending on the teeth to give support to those parts, providing, of course, that the patient has erupted teeth. In every operation for cleft palate in young persons before the teeth have erupted, the operator must have a knowledge of what may be expected to develop in the future, so that he will be able to establish or close the cleft in such a manner that it will be possible for the teeth to erupt approximately in normal positions. He must also close the cleft in such a manner as to allow a closure of the cleft of the lip and maintain the normal function of the lip, realizing the necessity of normal muscular pressure in the development of the face and of the dental apparatus. We know from experience that the practice of orthodontia has an intimate relation with the medical profession, but it will require considerable education of the dental and medical professions before we will succeed in making the physician, dentist, and oral surgeon realize that a knowledge of orthodontia and of the occlusion of the teeth and forces of occlusion is necessary in order that the patient may receive the best possible results from oral surgical operations. Orthodontia is a much newer

science than oral surgery, and it will necessarily require some effort to make a man who has been doing oral surgery with the idea of simply closing the cleft realize that there is a better procedure, that there is a technic far superior and that there is a method by which far better results can be obtained by taking advantage of the knowledge which almost any orthodontist possesses. We believe that the successful oral surgeon in the future will be the man who has both medical and dental training, who is familiar with general surgery and pathology, and who knows enough about orthodontia and oral surgery to combine the two in his work and thereby render greater benefit to his patients.

Malocclusions in Dental Clinics.

DURING the past few years endowments have been placed by philanthropic men for the purpose of establishing free dental clinics in large cities for the worthy poor. There is no question that the establishment of free dental clinics, if properly conducted, will be a great benefit to the human family. There is also, however, no question that the establishment of such free dental clinics, with unlimited dental service to whoever may apply, will do corresponding harm to the public and the dental profession. Nothing else lowers the value of an article so much as the fact that it can be obtained free—to establish a condition whereby the public fails to place a proper value on a certain article or service. It is true that there are a large number of people in a city of any considerable size who cannot afford dental treatment if they are forced to pay for it. There is, however, a great danger of creating conditions similar to those that exist in large hospitals for the sick. Anyone who has been associated with the free medical clinics realizes the difficulties encountered in keeping the unworthy out of the medical clinic. It frequently occurs that a person who is amply able to pay for medical treatment will apply at some hospital for free treatment. It may happen that the management of the particular hospital to which such application has been made obtains information which causes the applicant to be refused treatment on the ground that he is able to pay for medical services, and cannot be allowed to crowd out some one who is not able to pay. This does not, however, always remedy the matter, as the patient will probably go to some other medical clinic and receive the services he is determined to obtain. This condition demands some means whereby a free dental clinic can be so conducted that the unworthy are prevented from practicing such deception. Many arguments have been advanced for the establishment of a free dental clinic because the dental colleges were unable to take care of the worthy poor, or were not inclined to take such care. It has, however, been our observation that any person can receive treatment at the dental college clinics without pay if the applicant can show that he is worthy and is unable to pay even the small amount for the material.

Now, in regard to orthodontic treatment in the free dental clinic, we have another problem that is more important than the usual free dental services. While there probably is no other one treatment that will do an in-

dividual as much good as to have a bad case of malocclusion corrected, still the correction of malocclusion is not absolutely necessary to save the life of the individual. It may be necessary for the health of the individual, but, so far as life and death are concerned, malocclusion is not to be compared to a necessary major surgical operation; which must be performed at a particular time in order to save the patient. The time required for orthodontic treatment extends over quite a number of years, and the age limit is gradually being extended. We mention this because it may be that when a patient is 7 years of age the parents may be unable to pay for orthodontic treatment, but by the time the patient is 13 or 14 years old they may be amply able to pay for such services. We have known of persons desiring to receive treatment in a dental clinic, claiming that they could not pay for orthodontic services, when, as a matter of fact, they owned a home and had an automobile. Some of these applicants claimed they could not pay for orthodontic treatment because they were paying for a home, when they probably had more worldly goods than many orthodontists. We have had experience for a number of years in dental college clinics and clinics in post-graduate schools, and have become familiar with the class of people who seek orthodontic services. We have been told by teachers in large dental schools in other cities that people are continually applying at the dental clinic for orthodontic services who are well able to pay for treatment, but, because proper treatment is, as a rule, a matter of several hundred dollars, they consider that, if they can get the work done in a dental clinic for \$50.00 or \$60.00, or about the cost of the appliances, they are making that much money. Do not understand us to say that we are opposed to free orthodontic services or to orthodontic clinics for the worthy poor, but we certainly are opposed to the promiscuous admission of patients who apply for orthodontic services as is practiced in some dental schools.

We are of the opinion that if at 12 or 13 years of age a malocclusion is very extensive, producing a facial deformity, and the patient cannot pay for having the case treated, and there is very little prospect that he will be able to pay 4 or 5 years from that time, we certainly feel that an effort should be made to correct that deformity, but we do not think the work should be entirely gratuitous, for our experience has been that cases which have been treated free of all cost are usually failures. In an experience extending over 15 years in orthodontic clinic we have yet to see a case of malocclusion begun entirely gratuitously that was ever carried to completion. The reason for this lack of completion is that the treatment of the malocclusion usually extends over a number of years in order to attain permanent results. Incomplete corrections that will not be permanent because the teeth are not yet in their proper positions may satisfy the patient and he will cease keeping regular appointments, or may fail to come at all, as he has an improved result, without any outlay, and he feels that the longer he comes the more it will cost him in time. In orthodontic clinics the patient should pay for the services according to his ability, that is, if \$10.00 is a proper charge, he should pay \$10.00, or such proportionate amount as will be large enough to cause him to keep his appointments. Unregulated charity has done much harm. We have been told by social workers that unregulated charity brings evil in many instances and that in the course of a year considerable of the money

that is given to charity is practically wasted. Some social workers claim that not more than 10 per cent of the amount contributed to charity is effectively applied for the purpose intended. We believe that if this is true, a similar condition may prevail in free dental clinics, especially in regard to the treatment of malocclusions. In order to make people realize the value of orthodontic services, and in order to have patients keep their appointments, so that the contemplated benefit can be accomplished, it is necessary that they pay something. One of the prime advantages of a dental, medical, or orthodontic clinic is the factor of instruction for the profession. No practitioner or student would care to be connected with an orthodontic clinic unless it be possible for him to finish his cases, so that he could obtain complete data as to the result of the treatment and the value of the different appliances, as he would not maintain interest in a clinic very long if he simply started the cases and could not carry them to completion. An orthodontic clinic should, therefore, to be of any value to operator or patient, be conducted in such a manner as to compel the patient to have the treatment carried to completion. We say again that nothing else will be so effective in compelling a patient to continue treatments as to be obliged to pay a fee, which should be large enough to have a commercial value.

We again caution those in the dental profession who are advocating free dental and orthodontic clinics that it is possible for such free clinics to be productive of a great deal of harm if they are not properly conducted, and we believe that at the present time free orthodontic services to the public, even in an endowed clinic, is not advisable for the reasons mentioned. We have seen patients who needed orthodontic treatment and needed it badly, but we have yet to see one of those cases, under our observation, carried to completion unless the patient was compelled to pay for the services.

Report on Classification of Malocclusion in the Forsyth Dental Infirmary Clinic.

THE records of classification of the first 500 cases of malocclusion examined in the Forsyth Infirmary (Angle classification) has been reported as follows:

Class I.....	339
Class II.....	111
Class III.....	29
Normal.....	21
	<hr/>
	500

The divisions and subdivisions of Class II and III are not reported. The report also states that the Morse chart was not used in the majority of cases, but in any instance where there was a question of doubt as to the proper classification the case was not classified.